NSW Health

NSW GOVERNMENT

Net Zero Roadmap

2025–2030

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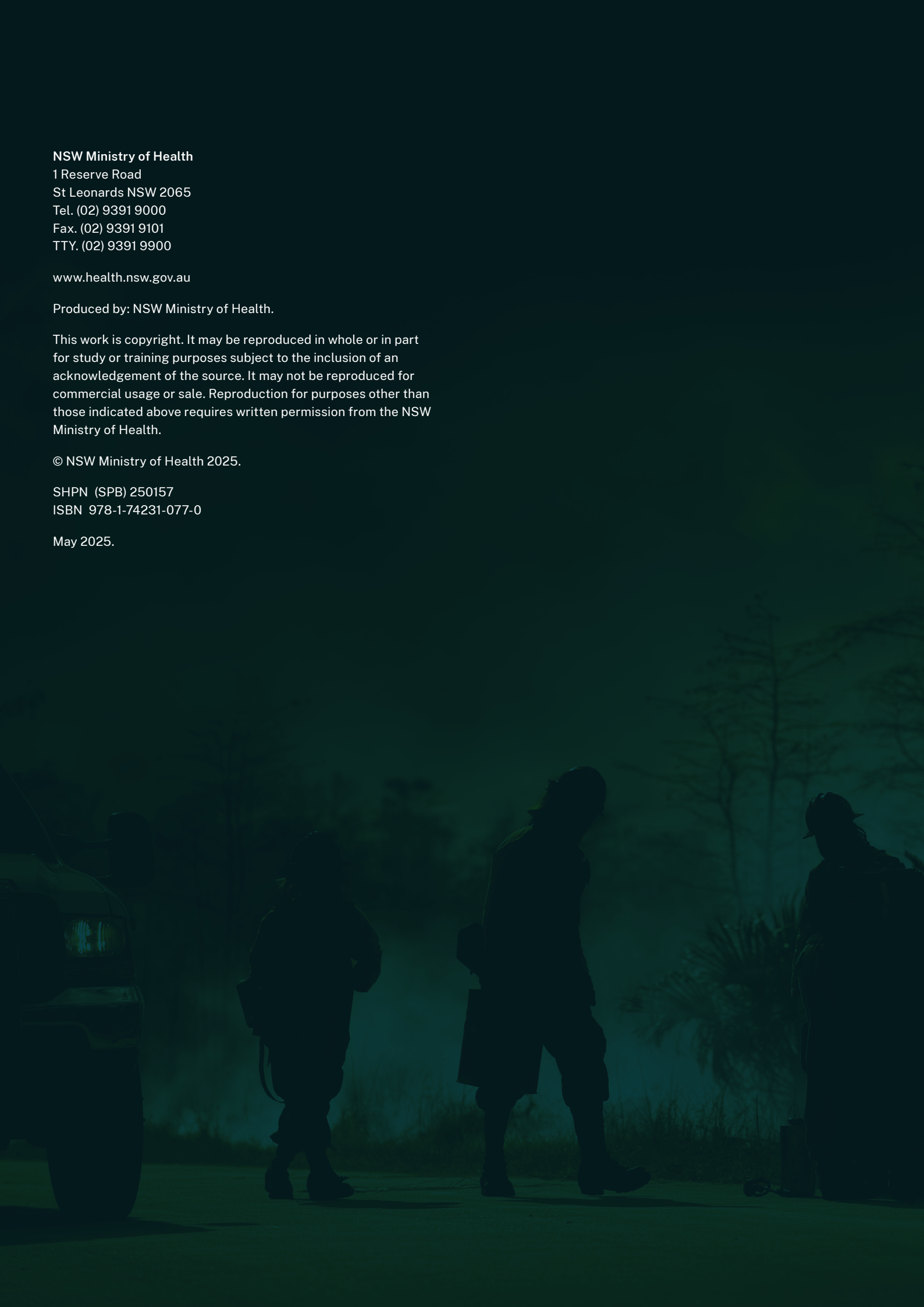

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Above: Mid North Coast Local Health District, Macksville Hospital

Acknowledgement of Country

NSW Health acknowledges the traditional custodians of the lands and waters across NSW. We acknowledge the many Aboriginal nations, their Elders both past and present, and offer our respect to all Aboriginal people.

We acknowledge that Aboriginal people are remarkable stewards of this Land and have been for more than 60,000 years. The principles of stewardship and caring for Country will be critical in developing an environmentally sustainable, climate resilient health system.

We acknowledge that Aboriginal and Torres Strait Islander-led initiatives in climate change adaptation and mitigation strengthens community wellbeing. To that end, all our work seeks to uphold the idea that if we care for Country, it will care for us.

We commit to listening to and learning from Aboriginal people in NSW about how we can better reflect Aboriginal ways of knowing, being and doing in our net zero transition.

The Roadmap will build on a strong partnership approach with the Aboriginal community, aligned with the strategic direction of the NSW Health Aboriginal Health Plan 2024-2034, as well as Closing the Gap Priority Reforms, including what evidence tells us.

We acknowledge that:

- climate change has a significant impact on people's health and wellbeing, including their physical health, social, emotional, and spiritual wellbeing;[1]
- climate change is disrupting cultural and spiritual connections to Country that are central to health and wellbeing;[1] and
- that all climate and health policy must be informed by Aboriginal leadership, knowledge, and experience.[2]

Minister's foreword

The Hon. Ryan Park, MP
Minister for Health, Minister for Regional Health

The NSW Government has committed to whole-of-government climate action to ensure a sustainable and fair future for the people, economy and environment of NSW.

The *Climate Change (Net Zero Future) Act 2023* legislates emissions reduction targets for NSW, including a 50% reduction (based on 2005 levels) by 2030 and net zero by 2050. This legislation is now backed by comprehensive policies and requirements including the Net Zero Government Operations Policy and Climate-Related Financial Disclosures, led by NSW Treasury.

As Health Minister, I'm particularly supportive of these policies because many climate actions will have public health co-benefits: cleaner air, healthier diets, greener and cooler cities and more connected communities.

We know that health systems themselves use significant amounts of resources, produce vast amounts of waste and have large carbon footprints. Therefore, I'm delighted that NSW Health is taking such a strategic, active approach to reducing waste and emissions, whilst maintaining or improving our high standards of care.

This Net Zero Roadmap showcases much of the great work already underway across NSW Health, including shifting to renewable energy, decarbonising the fleet, reducing single-use plastics, developing modern, low carbon models of care and supporting innovative ways to deliver care whilst reducing travel emissions.

Based on carbon footprinting to date, the Roadmap then sets out a strategic approach to addressing the NSW Government's targets, in six priority areas.

NSW Health will continue to work in partnership with the Department of Climate Change, Energy, the Environment and Water and other Government agencies to report on its performance against the new policy each year to track progress.

I look forward to seeing NSW Health's progress, as we all work together towards a modern, high quality health system, fit for purpose in a low carbon future.

Joint message from:

Secretary, NSW Health and Deputy Secretary, System Sustainability and Performance

Susan Pearce AM
Secretary, NSW Health

Matthew Daly,
Deputy Secretary, System Sustainability and Performance

Climate change is having escalating impacts on human health and the health services we deliver. The Net Zero Roadmap consultation showed that 85% of staff and community respondents were concerned about the impacts of climate change on people's health. We know that peoples' health and wellbeing are intertwined with the environment we live in.

The NSW Health system contributes 6.6% of NSW's greenhouse gas emissions, with public hospitals representing over a third of the health system's carbon footprint.

We recognise that we cannot continue to deliver high-quality healthcare without responding to climate risk. Building a modern, low carbon and climate resilient healthcare system is our shared goal captured in Future Health strategic priority 6: *The health system is managed sustainably.*

This is an issue which is personally very important to our staff and community. More than 80% of our staff support action to make our health system more environmentally sustainable (2023 PMES). When surveyed, 90% of recently admitted patients support NSW Health and its hospitals providing health services in more environmentally sustainable ways. (AAPS, 2024).

This Roadmap will guide our strategic approach to the NSW Government's net zero targets. It sets out where we're at, what we've done and our direction for the next 5 years.

Work is already in progress across NSW Health, with identified carbon hotspots, leading programs and case studies showcased in this Roadmap.

As they show, every NSW Health staff member, from energy managers to food service staff to anaesthetists - has a role to play in our net zero transition.

The strategic priorities outlined in this Roadmap have been developed through the input of thousands of individuals who have generously shared their views, experiences and aspirations for our health system.

We acknowledge the dedication of thousands of staff across our health system who deliver high quality healthcare, whilst reducing waste and emissions.

It's our planet and our health. Together, we can all make a real difference.

Scene setting

Overview

Adapting to a changing climate

The health of our planet is interlinked with human health and wellbeing. People across New South Wales (NSW) are already experiencing the impacts of a changing climate. While changes vary across the state, in general we are seeing higher temperatures, changes to rainfall patterns, and increases in fire weather and the risk of bushfire. Changes to our everyday weather and the weather extremes are driving disasters. Most recently these have included the unprecedented cycle of heatwaves, droughts, bushfires, storms and floods.

These changes in weather directly affect our health and wellbeing in many ways. For example, exposure to higher temperatures can cause heat stroke or heat exhaustion. More frequent floods and bushfires may cause more injury and death.

The effects of climate change can also affect human health in indirect ways including lung and heart disease from air pollution; anxiety and depression may increase in communities where extreme weather displaces people from their homes and impacts their livelihoods; food- and water-borne disease may increase with rising temperature: mosquito-borne disease may spread more easily under warmer and wetter weather conditions: poor nutrition can result from a decrease in the supply and affordability of healthy food due to extreme weather: allergens worsen due to changes to pollen seasons and conditions that promote mould growth.

In recognition of the urgent need to address the health risks of climate change, the Australian Government's Department of Health and Aged Care launched Australia's first National Health and Climate Strategy. The Strategy sets out the whole of government plan to address the health and wellbeing impacts of climate change and address the health system's contribution to climate change.

In Australia and internationally, the pace of change in decarbonisation, and the shift to low-carbon and circular economies is progressing rapidly. Within NSW Health, our staff are implementing innovative programs, technologies, policies and practices towards the NSW Government's net zero targets.

This Roadmap will be reviewed and updated as our climate risk response matures.

How this Roadmap was developed

Strategic alignment

NSW Health's first Net Zero Roadmap was developed to align with and support the whole of NSW Health strategy Future Health 2022-2032: in particular, our commitment to delivering an environmentally sustainable footprint for future healthcare (key objective 6.2).

How we engaged with staff, community and our partners

More than 2,200 contributions were received as part of the consultation process. The NSW Ministry of Health worked closely with local health districts, specialty health networks, pillar organisations, statewide health services, consumers, community members and key partners to undertake consultation to inform the Roadmap.

Extensive consultation and engagement with key stakeholders informed the Roadmap, including:

- 36 consultation sessions were held April-May 2024 to gauge insights from NSW Health staff across the system. The sessions drew on the experiences and ambitions of NSW Health staff gauging their views on what worked well and what could be improved across the proposed priorities.
- Between 20 March and 31 May 2024, a draft Roadmap was developed and hosted on the NSW government 'Have Your Say' platform outlining the proposed vision, priorities, guiding principles and enablers. More than 4,500 people visited the site with over 1,770 contributions comprising 664 survey responses, 1,077 quick poll responses and 65 visioner ideas were shared on how NSW Health could provide healthcare in more environmentally sustainable ways.
- Targeted consultation engagement with key federal and NSW Government stakeholders, including individuals representing the National Health, Sustainability and Climate Unit, the National Health and Medical Research Council, the Australian Commission on Safety and Quality in Health Care, the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW), NSW Treasury, Investment NSW and the NSW Environmental Protection Authority.
- Targeted consultation engagement with external partners including the Catholic Health Australia, nursing, midwifery, and medical colleges.

The NSW Health Environmental Sustainability Steering Committee provided guidance and direction for the development of the Net Zero Roadmap.

There will be ongoing collaboration in the monitoring, reporting and evaluation of the Roadmap to focus efforts on shared outcomes and ensure delivery against the NSW Government's net zero targets.

We thank everyone for their valuable contribution, collaboration and commitment to making this Roadmap an informed blueprint for achieving the NSW Government's net zero targets.

Left: Northern Sydney Local Health District, NSLHD staff enjoying the green space at the Royal North Shore Hospital campus

Overpage: This artwork was created by Tatum Kenna, to tell the story of why environmental sustainability matters to NSW Health staff.

Figure 1: Stakeholders engaged as part of the consultation process

Contributing stakeholders	
Commonwealth Government	National Health, Sustainability and Climate Unit National Health and Medical Research Council Australian Commission on Safety and Quality in Health Care
State Government	NSW Department of Climate Change, Energy, the Environment and Water NSW Treasury Investment NSW NSW Environmental Protection Authority
NSW Health organisations	NSW Ministry of Health Local Health Districts Specialty Health Networks: Justice Health and Forensic Mental Health Network, the Sydney Children's Hospitals Network Pillars: Agency for Clinical Innovation, Bureau of Health Information, Cancer Institute NSW, Clinical Excellence Commission, Health and Training Institute Statewide health services: NSW Ambulance, NSW Health Pathology, Health Protection NSW Shared services: HealthShare NSW, eHealth NSW, Health Infrastructure
Representative organisations	Australian College of Nursing Catholic Health Australia The Australasian College of Dermatologists Australasian College for Emergency Medicine Australian College of Rural and Remote Medicine College of Intensive Care Medicine Royal Australasian College of Medical Administrators Royal Australasian College of Physicians Royal Australasian College of Surgeons Royal Australian and New Zealand College of Obstetricians and Gynaecologists Royal Australian and New Zealand College of Psychiatrists Royal Australian College of General Practitioners

Our planet

Our health

illustration by tatumkenna.com

Roadmap snapshot

Our vision

NSW Health becomes a ‘leading modern, high-quality, low-carbon and climate resilient health system by focusing on quality, value, innovation and equity.’

Guiding principles

The Roadmap is informed by these four interlinked principles:			
Aboriginal leadership Grounded by deep Aboriginal knowledge about caring for Country and working in partnership with Aboriginal colleagues and communities on climate and health policy.	**Health equity approach** Climate change disproportionately impacts the most vulnerable groups in our society, the same groups which also often have least capacity to adapt. Our climate risk response must take account of existing health disparities and optimise the health benefits of climate actions.	**Evidence-informed** Commitment to apply the best available evidence, data and research about climate change and the scale and pace of the transition that is required to achieve a net zero, climate resilient health system.	**Partnerships** The transition will require collaboration and partnerships with a range of internal and external partners including our staff, patients, families, community, all levels of government, non-government organisations, academia, research, industry, the private sector, and peak bodies, to ensure a healthy future.

Priorities

The Roadmap outlines six strategic priorities to achieve a high-quality, low-carbon, climate resilient healthcare system	
Healthcare	Transitioning to modern, high quality, low carbon models of care for our patients, guided by the principles of sustainable healthcare.
Land and buildings	Supporting healthy people and places by decarbonising the design, construction, use and disposal of our buildings; and being stewards of our land and waters.
Energy and water	Improving air quality and health by using our natural resources (energy and water) in sustainable ways, including transitioning to clean renewable energy.
Supply chain	Reducing the environmental and financial costs of our supply chains, including the way we purchase goods and services, engage with our suppliers and drive circularity.
Travel and transport	Improving air quality and health by reducing emissions from staff, patient and visitor travel. This includes shifting towards active modes of transport, electrifying our fleet (including ambulances), and exploring innovative ways to deliver care remotely.
Food services	The sustainable sourcing, production and provision of high quality, healthy food for patient healing and wellbeing, whilst minimising food waste.

System enablers

To enable action across the 6 priority areas, five cross-cutting ‘enablers’ have been identified				
Workforce, leadership and training	Procurement	Assets and infrastructure	Communications and engagement	Research, innovation and offsetting

Showcasing our enablers

Our vision is supported by five cross-cutting enablers. The information below showcases some initiatives already underway across the system

CASE STUDY: WORKFORCE, LEADERSHIP AND TRAINING

The future of health is green

In 2024, Northern Sydney Local Health District (NSLHD) released its Planetary Health Framework 2024-2027, guiding the district's planetary health efforts for the next four years and its commitment to reach net zero by 2035 for the emissions it controls (scope 1 and 2), and net zero by 2050 for the emissions it can influence (scope 3).

To help achieve these goals, the district undertook an evidence-base project to calculate NSLHD's baseline carbon emissions and map a pathway to net zero. The project was delivered by the NSLHD Planetary Health team in partnership with Arup Australia and NSW DCCEEW.

CASE STUDY: PROCUREMENT

Environmentally Sustainable Procurement Guidance Paper

In 2024, NSW Health published an internal guidance paper for environmentally sustainable procurement, outlining best practices to align the existing NSW Health Procurement Policy to support environmentally responsible purchasing. The guide is underpinned by principles such as supplier evaluation, life cycle analysis, local sourcing, materials and recycled content and green certifications. The paper addresses key challenges balancing cost with sustainability, managing complex supply chains, and overcoming supplier resistance, offering practical strategies to drive long-term value.

CASE STUDY: COMMUNICATIONS AND ENGAGEMENT

NSW Health Awards

In 2023, NSW Ministry of Health introduced a new Environmental Sustainability Award category into the NSW Health Awards.

The Environmental Sustainability Award recognises the achievements of our health system and workforce to reduce our environmental footprint, whilst continuing to deliver high quality healthcare and patient experience.

CASE STUDY: COMMUNICATIONS AND ENGAGEMENT

Transforming trash into trophies

In 2023, Hunter New England LHD partnered with a local plastic recycler, Resourceful Living, to explore opportunities to divert single use plastic products from landfill and give them new life. The partnership with Resourceful Living, Muswellbrook Shire Council and The Melt resulted in the design and manufacture of the 2023 Hunter New England Local Health District Excellence Award trophies out of plastic waste generated from their renal dialysis units. The partnership resulting in 415kg of single use plastic being repurposed that would otherwise have been destined for landfill. The project saved 2230kg of CO_2 emissions which is equal to driving 13360km in a standard car. Hunter New England LHD are working directly with suppliers to ensure that they are procuring well designed products that facilitate resource recovery and promote a circular economy.

CASE STUDY: RESEARCH, INNOVATION AND OFFSETTING

2022/23 Sustainable Futures Innovation Fund

In 2023 the Sustainable Futures Innovation Fund supported 17 frontline staff-led innovation projects that aim to improve patient outcomes and reduce our carbon footprint.

Hear from one of the Fund recipients, Derek Key, who shares his passion to help reduce our carbon footprint.

"I am very grateful to be a recipient of the NSW Health Sustainable Futures Innovation Fund. This will support my work as part of the Net Zero Leads Program funded by the Climate Risk and Net Zero Unit. Developing carbon efficient processes will help us deliver efficient, effective and high value care. I believe that everyone has a role in environmental sustainability. It will require investment and change from all of us, but this is an opportunity to reflect on our personal and professional activities and make positive changes for the services we deliver and the communities we deliver services to."

Alignment to NSW Health's vision

The Net Zero Roadmap aligns with other statewide health strategies to improve health outcomes for the people of NSW, primarily Future Health: Guiding the next decade of health care in NSW 2022–2032, and NSW Regional Health Strategic Plan 2022–2032.

Future Health provides the strategic framework and priorities for the whole health system over the next decade. It outlines NSW Health's commitment to delivering an environmentally sustainable footprint for future healthcare (key objective 6.2). The Roadmap also aligns with the NSW Regional Health Strategic Plan's commitment to an environmentally sustainable footprint for future regional healthcare (strategic objective 6.4).

Addressing the challenges and responsibilities of health system decarbonisation split across different NSW Health organisations

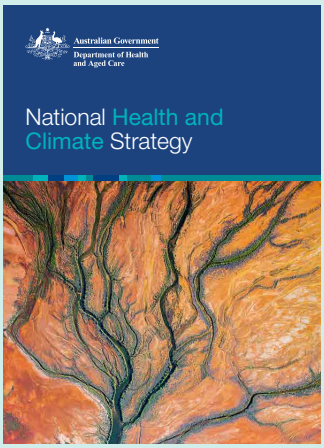
The Roadmap will deliver improved environmental sustainability outcomes through the effective use of the resources and networks of NSW Health and through collaboration with our communities and all our partners. The Roadmap is informed and enabled by statewide strategies that outline priorities and actions across the broader health system. Local health districts, specialty health networks, state-wide health service, shared services, pillars and other health organisations are encouraged to incorporate environmental sustainability and climate risk prominently in their local strategic and business planning, so that they are fully aligned to the strategic direction set by this Net Zero Roadmap.

The changing policy landscape

In addition to the statewide guidance outlined in Future Health and the NSW Regional Health Strategic Plan, the Net Zero Roadmap is enabled and informed by a broader policy context at both the state and federal levels.

Federal strategies and commitments

The National Health and Climate Strategy



The Strategy sets out a whole-of-government plan to address the health and wellbeing impacts of climate change and address the contribution of the health system to climate change.

Key legislative measures

Climate Change (Net Zero Future) Act 2023

The Act legislates emissions reduction targets in NSW and establishes an independent Net Zero Commission. It legislates:

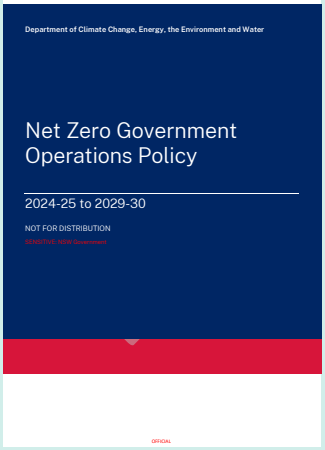
- guiding principles for action to address climate change that consider the impacts, opportunities and need for action in NSW
- emissions reduction targets for NSW:
  - 50% reduction on 2005 levels by 2030
  - 70% reduction on 2005 levels by 2035
  - net zero by 2050
- an objective for NSW to be more resilient to a changing climate
- establishing an independent, expert Net Zero Commission to monitor, review, report on and advise on progress towards these targets.

NSW climate and environmental strategies and frameworks

Net Zero Plan Stage 1: 2020-2030

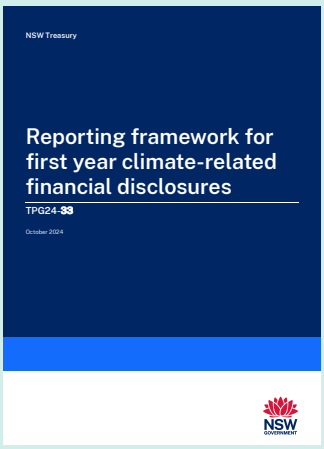
The Plan is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050.

Net Zero Government Operations Policy 2024-25 to 2029-30 (formerly NSW Government Resource Efficiency Policy GREP)

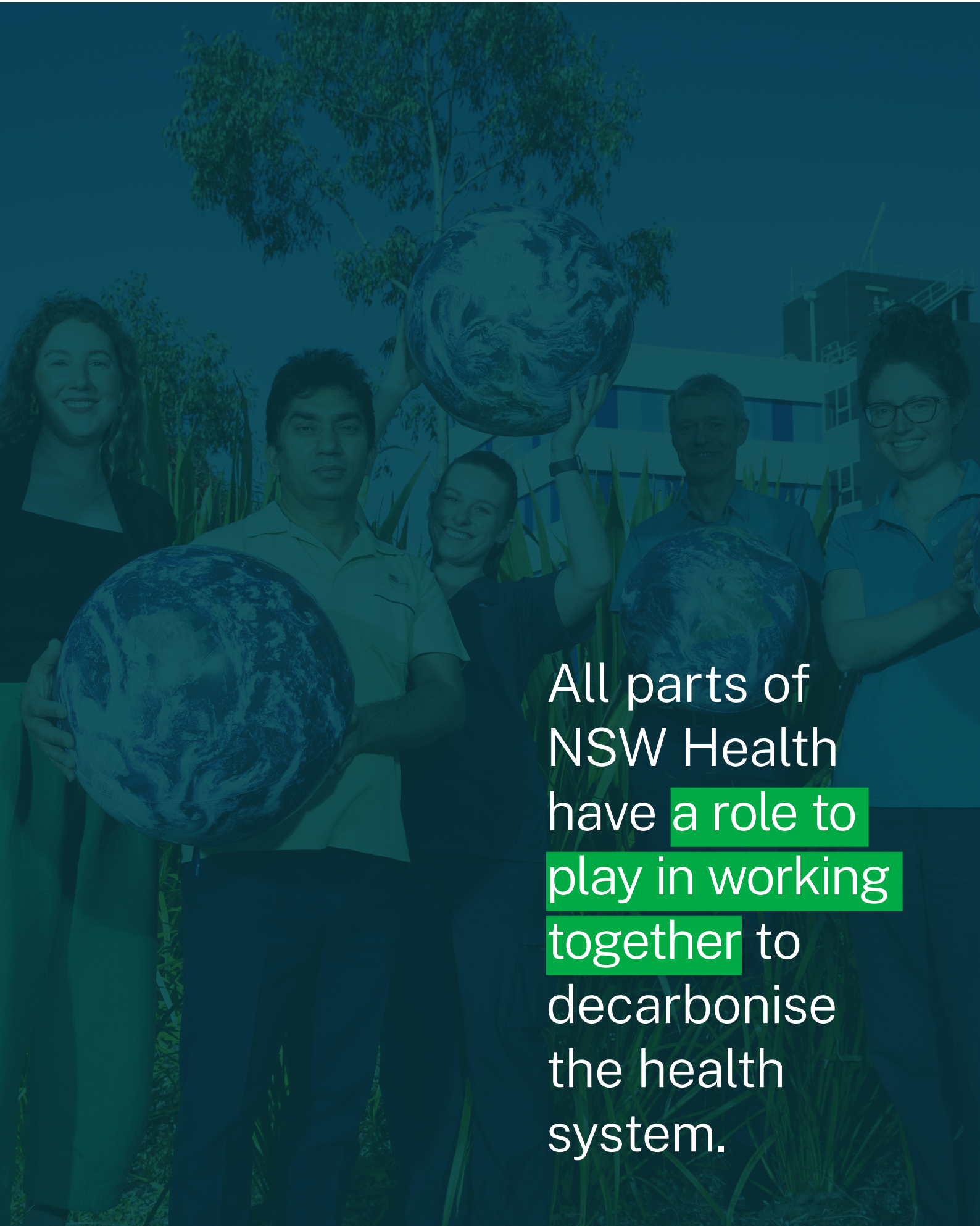


The Policy sets out 24 actions and targets across a range of areas, including energy efficiency; renewable energy; the electrification of buildings, fleet and gas; food waste; Scope 3 (supply chain) emissions; procurement; monitoring and reporting; and circular economy. The NSW DCCEEW is responsible for coordinating it's delivery and publishing guidance on implementation of the policy.

TPG24-33 Reporting Framework for First Year Climate-related Financial Disclosures



Under TPG23-10 Annual Reporting Requirements, NSW Government agencies are required to prepare climate-related financial disclosures alongside their annual reports. This mandatory requirement is being implemented in three phases, commencing in the 2024-25 financial year for Phase 1 entities. Disclosure of public sector entities' material climate-related risks and opportunities, including the actions entities are taking to manage these risks and harness opportunities, provides transparency and helps drive climate action.


All parts of NSW Health have a role to play in working together to decarbonise the health system.

Governance and delivery

All parts of NSW Health have a role to play in working together to decarbonise the health system.

The Climate Risk and Net Zero (CRNZ) Unit within System Purchasing Branch is responsible for coordinating the governance of the Net Zero Roadmap 2025-2030 and working with key partner health organisations and agencies to ensure clear accountability to support successful implementation and delivery against the NSW Government's net zero targets.

There are a number of governance structures responsible for ensuring the NSW Government meets the state's emissions reduction targets and the adaptation objective, including:

- **The Net Zero Commission:** The Net Zero Commission was established under the *Climate Change (Net Zero Future) Act 2023* to provide independent expert advice to ensure NSW is on a clear path towards net zero.
- **The Climate Change Network:** The Network is a Deputy Secretary level forum established in May 2024 by DCCEEW and The Cabinet Office (TCO) coordinating climate change actions across NSW Government portfolios.

The NSW Health Net Zero Roadmap is governed through regular reporting to the:

- **NSW Health Environmental Sustainability Steering Committee:** Chaired by the Deputy Secretary, System Sustainability and Performance, the Committee representatives include NSW Health Chief Executives, Executive Directors, consumers and partner organisation representatives from the NSW DCCEEW and Primary Health Network. The Committee was established in April 2022 to provide advice, assurance and oversight to support implementation and monitor progress towards Future Health's Strategic Outcome 6, key objective 6.2.

This Roadmap is not a static document. NSW Health will review the document periodically to incorporate new priorities informed by changes to policy, legislation, technological advances and other international drivers of healthcare decarbonisation.

Implementation Plan

The Roadmap is the blueprint for the decarbonisation work that the Ministry of Health will deliver across the system. To ensure the successful delivery of the Roadmap, the Ministry of Health will develop an Implementation Plan in collaboration with key stakeholders. The Implementation Plan will outline decarbonisation actions for each of NSW Health's top emission sources, allowing for specific programs, initiatives and collaborations to deliver the objective statements for each priority area.

Implementing and measuring progress

Emissions reduction targets

The NSW Government has legislated three emissions reduction targets for NSW through the *Climate Change (Net Zero Future) Act 2023*, including achieving:

- 50% reduction on 2005 levels by 2030
- 70% reduction on 2005 levels by 2035
- Net zero by 2050.

NSW Health is committed to delivering the NSW Government's net zero targets, including disclosing scope 1 and 2 greenhouse gas emissions (with future inclusion of scope 3).

Understanding health system emissions

Scope definitions

Scope 1 emissions:

Direct greenhouse gas emissions that occur from sources that are owned or controlled by an entity.

Scope 2 emissions:

Indirect greenhouse gas emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by an entity.

Scope 3 emissions:

Indirect greenhouse gas emissions (not included in Scope 2 greenhouse gas emissions) that occur in the value chain of an entity, including both upstream and downstream emissions.

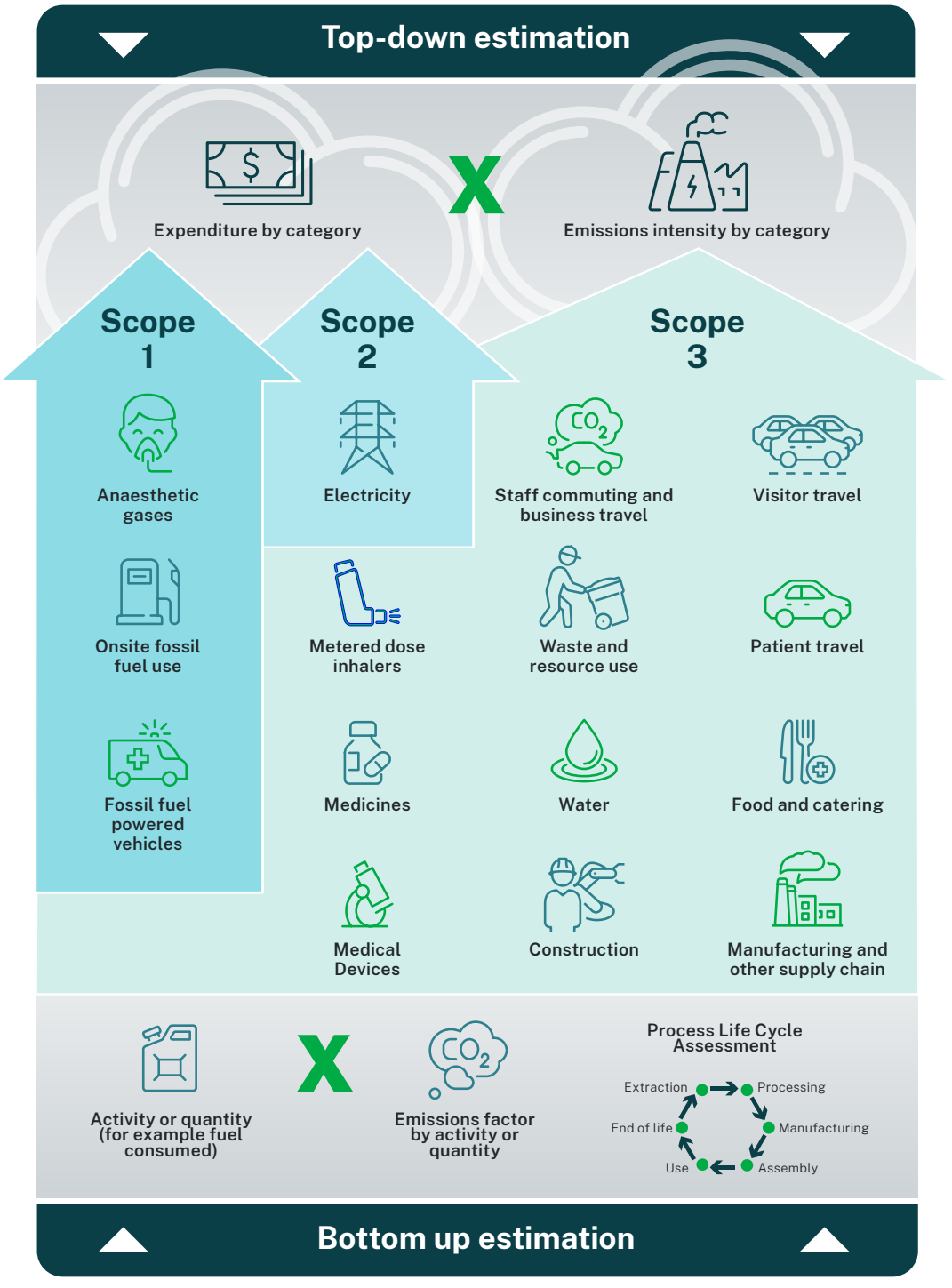
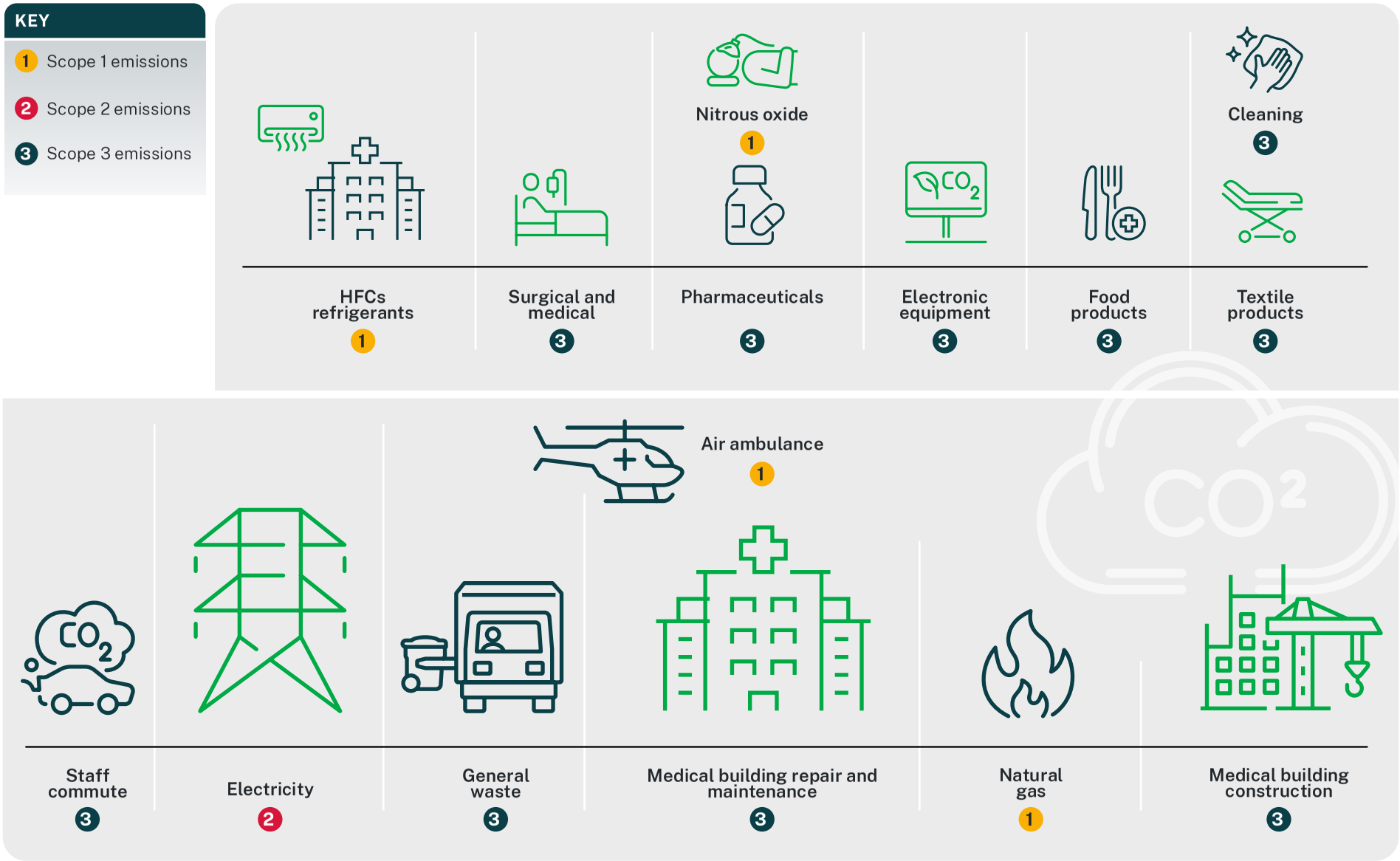


Figure 2:
Scope 1, 2 and 3 emissions and methods of emissions measurement.

Health system greenhouse gas emissions

The NSW Health system contributes to Scope 1, 2 and 3 GHG emissions. The below figure illustrates examples of NSW Health GHG emissions.

Figure 3: This figure illustrates most of the top 18 emission sources, however, not all sources of emissions are displayed.

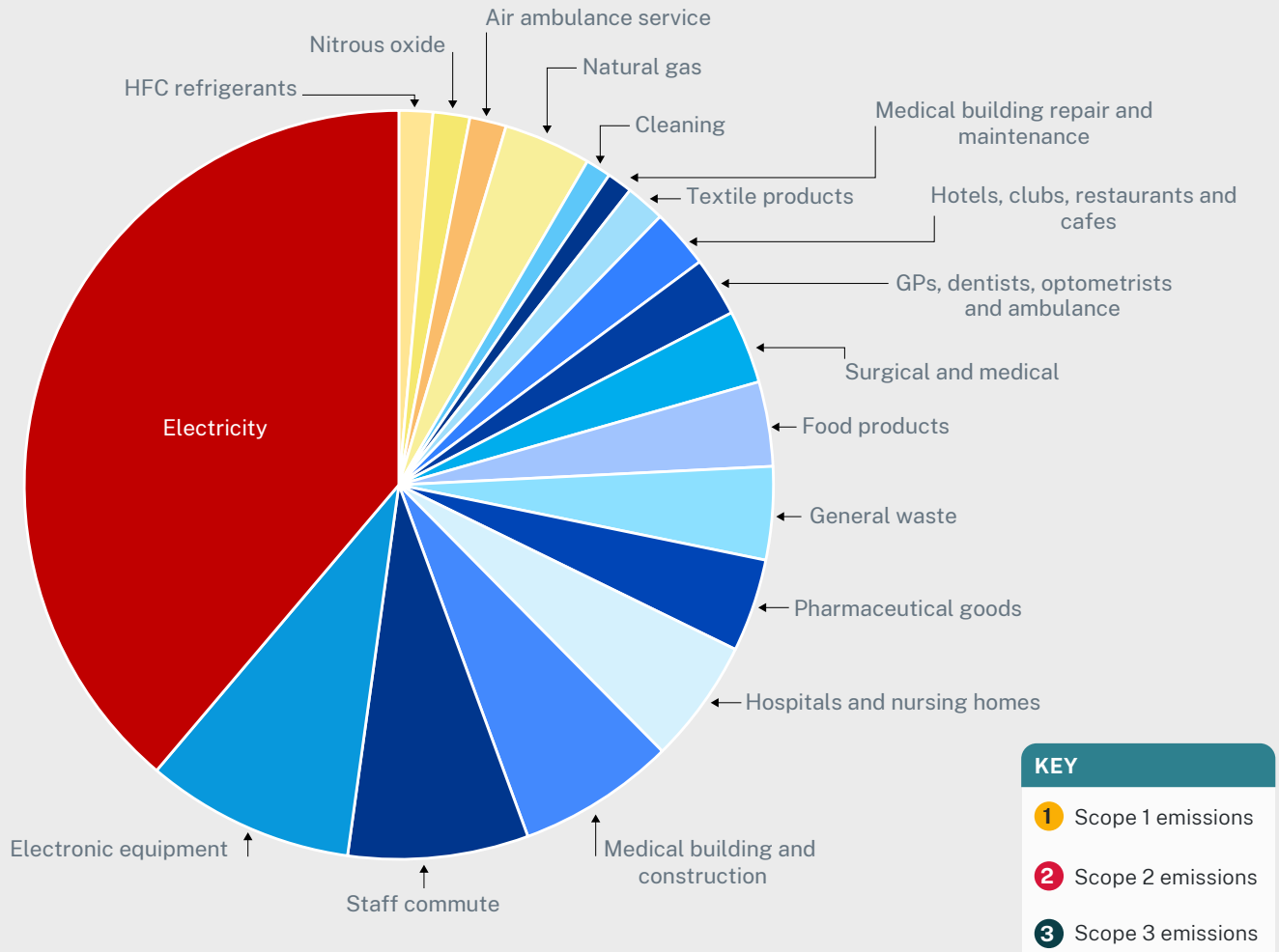


NSW Health's carbon footprint by emission hotspots

NSW Health's carbon footprint is informed by detailed analysis conducted across selected Local Health Districts and Specialty Health Networks. The data was derived using a combination of top-down and bottom-up modelling approaches, providing comprehensive coverage of Scope 1, 2 and 3 emission categories (see Figure 2).

18 emissions sources which together constitute 80% of NSW Health's carbon footprint were identified as key emission hotspots. Electricity is the most significant single emissions source, representing 31.9% of the total footprint, followed by electronic equipment (7.4%), staff commute (6.4%), medical building and construction (5.6%). The identified emission hotspots are outlined in the below figure.

Figure 4: The identified 18 emissions sources which together constitute 80% of NSW Health's carbon footprint.



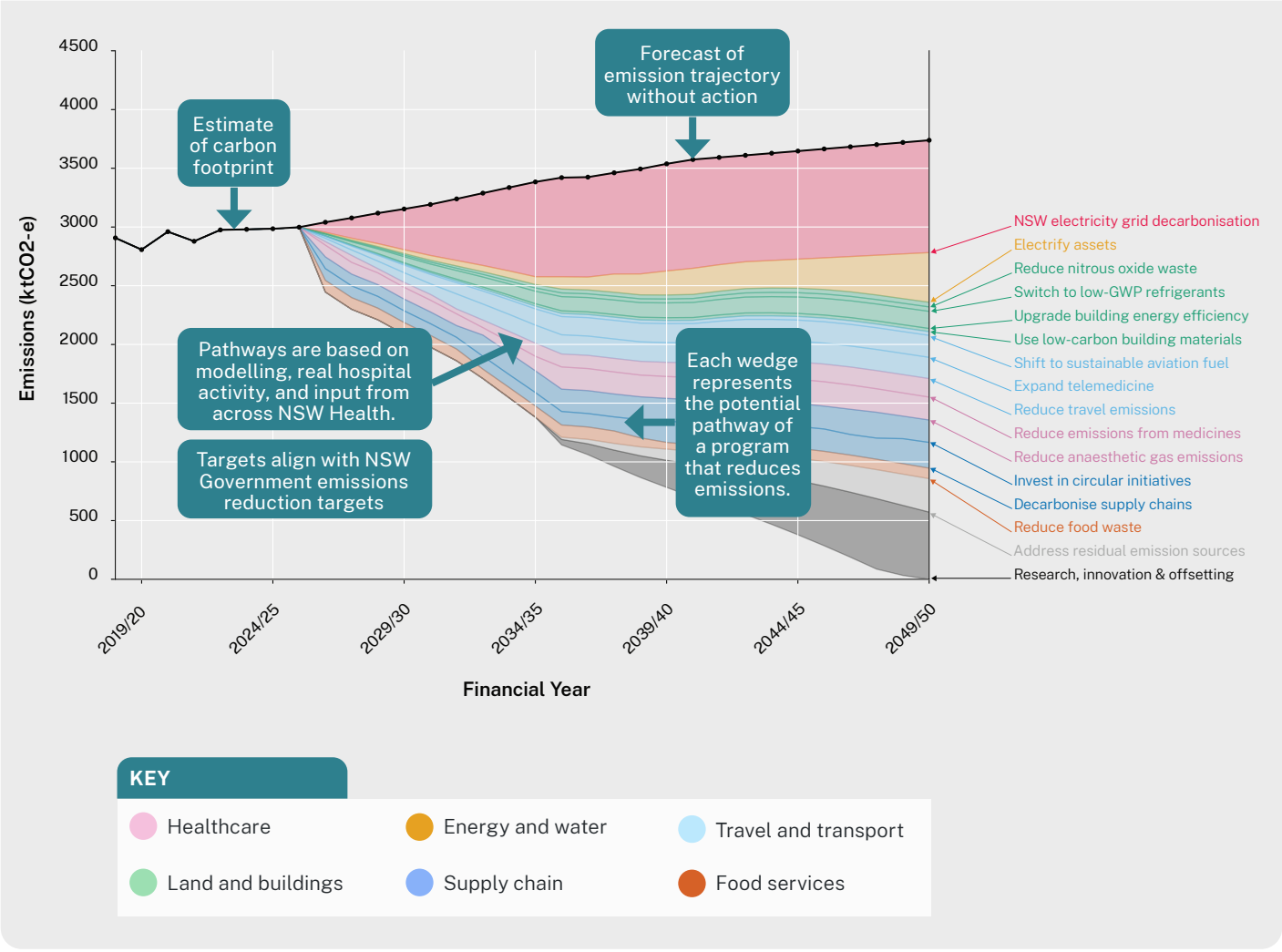
Our top emission sources:

Electricity: 31.9%
Electronic equipment: 7.4%
Staff commute: 6.4%
Medical building and construction: 5.6%
Hospitals and nursing homes: 4.4%
Pharmaceutical goods: 3.3%
General waste: 3.3%
Natural gas: 3.1%
Food products: 3%
Surgical and medical: 2.6%
GPs, dentists, optometrists and ambulance: 2.1%
Hotels, clubs, restaurants and cafes: 2.1%
Textile products: 1.4%
Air ambulance service: 1.3%
Nitrous oxide: 1.3%
HFC refrigerants: 1.2%
Medical building repair and maintenance: 0.9%
Cleaning: 0.9%

NSW Health's net zero pathway

Based on the 18 emission hotspots, potential emissions reduction opportunities have been identified against the six strategic priorities: healthcare, land and buildings, energy and water, supply chain, travel and transport and food services. NSW Health has committed to achieving the NSW Government's net zero targets. The below figure summarises potential carbon reduction opportunities for NSW Health across all scopes.

Figure 5: The projected reduction in NSW Health's emissions across all scopes from the baseline year of 2018/19 to 2049/50.



Proposed lead agencies and next steps

Based on NSW Health's emissions profile, the below table illustrates identified agency leads who are responsible for developing decarbonisation plans and associated business cases for each of the 18 emission hotspots.

Scope	Emission Source	Leads
1	Fleet	Ministry of Health Strategic Procurement
	Air ambulance services	NSW Ambulance
	Natural gas	Ministry of Health Infrastructure and Asset Management Division / Health Infrastructure
	HFC refrigerants	Ministry of Health Infrastructure and Asset Management Division / Health Infrastructure
	Nitrous oxide	Ministry of Health CRNZ/ Ministry of Health Infrastructure and Asset Management Division / Health Infrastructure
2	Electricity	Ministry of Health Infrastructure and Asset Management Division
3	Surgical and medical practices	Ministry of Health CRNZ/ HealthShare NSW
	Pharmaceutical goods	Clinical Excellence Commission/Ministry of Health CRNZ
	General waste	HealthShare NSW
	Food products	HealthShare NSW
	Textile products	HealthShare NSW
	Cleaning	HealthShare NSW
	Medical building construction	Ministry of Health Infrastructure and Asset Management Division / Health Infrastructure
	Medical building repair and maintenance	Ministry of Health Infrastructure and Asset Management Division /Health Infrastructure
	General practitioners, dentists, optometrists, ambulances	Ministry of Health Strategic Procurement
	Hospitals and nursing homes	Ministry of Health Strategic Procurement
	Hotels, clubs, restaurants and cafes	Ministry of Health Strategic Procurement
	Electronic equipment	eHealth
	Staff commute	Ministry of Health CRNZ/ Population and Public Health Division

Strategic priorities

Healthcare

Land and buildings

Energy and water

Above: Mid North Coast Local Health District, Nate Bennett in the garden he and his colleagues developed for young patients at Ellimatta House

Supply chain

Travel and transport

Food services

Overview

The six strategic priorities outlined in detail in the Roadmap are:

Strategic Priorities		
	**Healthcare**	Transitioning to modern, high quality, low carbon models of care for our patients, guided by the principles of sustainable healthcare
	**Land and buildings**	Supporting healthy people and places by decarbonising the design, construction, use and disposal of our buildings; and being stewards of our land and waters
	**Energy and water**	Improving air quality and health by using our natural resources (energy and water) in sustainable ways, including transitioning to clean renewable energy
	**Supply chain**	Reducing the environmental and financial costs of our supply chains, including the way we purchase goods and services, engage with our suppliers and drive circularity
	**Travel and transport**	Improving air quality and health by reducing emissions from staff, patient and visitor travel. This includes shifting towards active modes of transport, electrifying our fleet (including ambulances), and exploring innovative ways to deliver care remotely
	**Food services**	The sustainable sourcing, production and provision of high quality, healthy food for patient healing and wellbeing, whilst minimising food waste

Healthcare

Above: South Western Sydney Local Health District, Reducing the Use of Disposable Nonsterile Barrier Plastic Gowns

Outcome statement

Transitioning to modern, high quality, low carbon models of care for our patients, guided by the principles of sustainable healthcare.

Governance and delivery

Why is this important?

The Net Zero Government Operations Policy sets a range of actions for NSW Health targeting scope 1, 2 and 3 emissions. It outlines requirements for the health system to identify its largest scope 3 emissions sources and make plans to address them.

Clinical care - providing high quality healthcare to our patients - is at the heart of NSW Health. Our clinicians – nurses, doctors, and allied health professionals – will all play a crucial role in developing modern high quality, low carbon models of care. National and international research demonstrates that more than half of healthcare's carbon footprint is supply chain emissions from clinical care (pharmaceuticals, medical devices, equipment etc).[4] The evidence
– and increasingly our own experience in NSW Health – demonstrates that we can improve health outcomes and patient experience, whilst reducing waste and carbon emissions.

Principles of sustainable healthcare

Three principles of sustainable healthcare guide our approach to reducing emissions:

1. Keep people healthy and well. People who are healthy, well and independent in their homes and communities have high health and social outcomes and less reliance on carbon intensive areas of the health system. The delivery of public and population health services that reduce the onset and burden of disease, improve air quality, enable and support active travel and promote healthy diets and lifestyles, simultaneously reduce our greenhouse gas emissions.[2,4]

2. Focus on value-based healthcare. Focusing on value-based healthcare reduces the harms, risks and costs (financial and environmental) of low-value care (unnecessary investigations, procedures and medicines). This includes tackling unwarranted variation, reducing overdiagnosis, overtreatment, unnecessary imaging and pathology testing by promoting a value based healthcare approach.[2] This improves health outcomes that matter to patients and provide a better experience for staff.

3. Decarbonise evidence-based care. Where there is effective, evidence-based care, deliver it in low-carbon ways. This includes prioritising appropriate healthcare delivery and decarbonising known emissions hotspots across clinical specialties.

What we learnt from the consultation

The consultation process confirmed what is working well in the system and identified priorities and areas that are in most need of improvement.

What is working well

There were many examples of what is working well shared during the consultation, including:

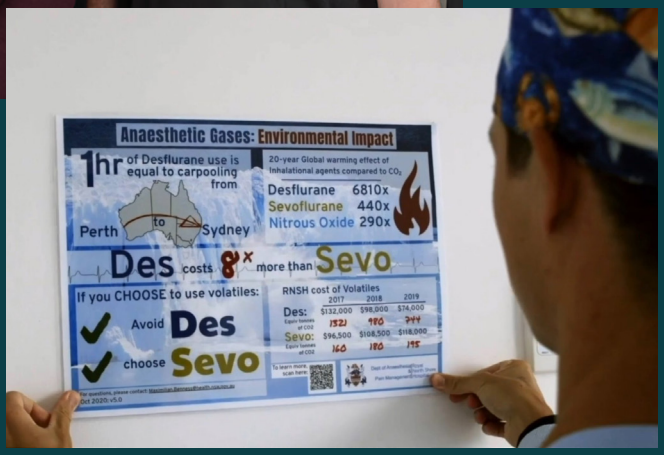
- Interventions focused on reducing low value care and unwarranted healthcare variation, for example the Rational Investigations Program achieved a 29% reduction in pathology tests at Coffs Harbour Emergency Department.
- Improvements and changes to the way in which care is delivered, with virtual care delivering care closer to home – providing more accessible care and reducing travel emissions. For example the telehealth stroke service which is reducing inappropriate transfer of patients and providing high-quality stroke care.
- Investment in precision medicine, cell and molecular therapies that are reducing the healthcare burden, improving patient outcomes and reducing environmental impacts.
- Digitisation programs and initiatives, for example e-Referrals, that are reducing our reliance on paper or phasing out paper altogether with the transition to paperless operations.
- Reducing emissions of medicines, in particular, medicines and gases with very high GWP, including volatile anaesthetic gases (desflurane) and nitrous oxide.
- Switching from single-use equipment and plastic items to reusable or more sustainable alternatives, such as introducing metal holloware and reusable gowns in operating theatres.
- Refurbishment for example EnableNSW's Going Circular pilot project.
- Establishment of green teams, sustainability committees and working groups supporting clinical champions. The NSW Health Sustainability Network acts as a connector across the NSW Health system supporting champions and driving collaboration.

What will be different in 2030

Moving forward there is a need to scale existing best practice, including:

- Investing in research and building the evidence base about effective interventions that improve health outcomes and reduce clinical care emissions, including investing in clinical pathway, carbon hotspot and life cycle assessments of medical equipment and devices. The consultation emphasised the need to invest in approaches that identify, measure and address unwarranted variation and reduce low value care.
- Leveraging digital solutions, such as virtual care and artificial intelligence, that improve access and health communication, particularly for regional and rural communities. Measurement of the co-benefits of reduced transport-related emissions should be considered.
- Take a *Health in All Policies* approach – promoting the health co-benefits of emission reductions across society and adaption action beyond the health system.
- Promoting a public health perspective that prioritises population health and prevention programs that assist with both the mitigation and adaptation agendas. Keeping people healthy and well through investing in wellness, prevention and early detection reduces the need for healthcare and associated emissions.
- Expand education, training and professional development options for staff and students at all levels to address knowledge and skill gaps. Improving staff education was identified as a priority. Opportunities include incorporating sustainable healthcare and climate resilience principles in staff training, education and quality improvement processes to help mobilise the health workforce to act.
- Promoting knowledge sharing and data collection across the state, supporting adoption of best practices in reducing clinical care emissions and climate action. Focus on measurement of all emissions to track and report on progress.
- Collaborating with the Commonwealth, NSW Government, professional bodies and key partners to decarbonise clinical care and improve the social determinants of health in a changing climate.

Supporting initiatives



CASE STUDY:

Anaesthetists switching to more sustainable anaesthetic gases

Anaesthetic gases comprise ~2% of NSLHD's carbon footprint. One gas, desflurane, has a global warming potential (GWP100) that is 2,540 times greater than carbon dioxide, making it a potent greenhouse gas.[7] In 2022, a team of anaesthetists at NSLHD set about reducing the impact of desflurane by encouraging a switch to using alternative and less polluting anaesthetic gases while continuing to deliver safe, high-quality healthcare.

A multifaceted project was implemented across the district, including a staff education and awareness raising campaign, training to support practice changes, and audits to monitor desflurane use.

The project was successful in significantly reducing desflurane use from 35 bottles per month to only four bottles over the 2022/23 financial year at Royal North Shore Hospital. This is equal to a reduction of carbon emissions from 1,321 tonnes to 0.75 tonnes. A direct cost saving of $344,087 and a global social cost saving of $105,048 per year was also calculated.[8]

Subsequently, the NSW Medicines Formulary Committee endorsed the decision to remove desflurane from the Formulary.

CASE STUDY:

Environmental impact of desflurane

The NSW Medicines Formulary Committee endorsed a decision to remove desflurane from the Formulary, effective from March 2024.

Many health systems in Australia and internationally are phasing out desflurane, and its use in NSW Health has reduced substantially in recent years as anaesthetists shift towards safe, clinically equivalent and less polluting alternatives.

The Committee cited three reasons for the decision: the availability of safe and clinically equivalent alternatives to desflurane, the high cost of desflurane and concerns about desflurane's environmental impact.

CASE STUDY:

NSLHD's Net Zero Leads Program 2022-24

NSLHD has established an Australian first Net Zero Leads Program which supports clinicians to lead a project to reduce emissions in their specialty or service. Twelve clinicians from anaesthetics and surgery, endocrinology, respiratory medicine, paediatrics, nursing, pharmacy and physiotherapy are supported half to one day/week by the NORTH Foundation, to research and deliver a net zero project.

CASE STUDY:

Ministry of Health Net Zero Leads (2022-24) and Hubs (2024-27) programs

To support NSW Local Health Districts and Specialty Health Networks, the Climate Risk and Net Zero Unit piloted a Net Zero Leads program. Ten clinicians across nursing, medicine and allied health disciplines were supported 0.2FTE each to lead a net zero project in their service or specialty and embed net zero carbon principles into the delivery of care. More than half of the Net Zero Leads were appointed from regional LHDs. The Leads addressed known carbon hotspots in anaesthetics, critical care, theatres, and pharmacy.

Given the success of the pilot, an expanded program of multi-disciplinary hubs was launched in November 2024. Seven hubs were established across known carbon hotspots including surgery, ICU, ED, renal, endoscopy, paediatrics and infection prevention services. The hubs are responsible for becoming exemplars and guiding decarbonisation activities across the state, in their service or specialty.

CASE STUDY:

Gloves Off!

It is estimated that Hunter New England Local Health District uses almost ~28.3 million gloves, producing 100 tonnes of waste and a carbon footprint of 1000 tonnes CO2e.

The Gloves Off! project at John Hunter Hospital, aimed to improve hand hygiene and reduce unnecessary non-sterile glove use through the implementation of a targeted hand hygiene education program.

The project was successful in improving staff capability in performing standard precautions risk assessments, improving patient care, saving money, reducing waste and minimising Hunter New England LHD's carbon footprint.

Unnecessary glove use reduced from 60% pre-intervention to 31% post-intervention and 23% at six-month follow-up.

Hand hygiene compliance improved from 59% pre-intervention to 69% post-intervention and 83% at six-month follow-up. Ward glove purchase numbers reduced by 21%. The project achieved a waste reduction of 260kg and carbon savings of 2,566 kgCO2e, which equates to an equivalent carbon footprint of driving a fuel-efficient petrol car 7,000km (approximately halfway around Australia).

CASE STUDY:

Pressure to reduce waste

Historically, there has been limited reuse of PAP devices, including both CPAP and NIV devices, within NSW Health loan pools and equipment allocation programs for home use.

One of the 2022/23 Sustainable Futures Innovation Fund projects investigated the presence of bacteria in air samples taken from PAP devices to develop an evidence base to support the re-purposing of respiratory equipment and guideline development.

The benchtop proof of concept study demonstrated that the risk of transmission of viable bacteria in air flow is very low; with surface swabs showing that current cleaning procedures were sufficient for removing any organisms of concern from the external surfaces. The study's findings support equipment re-use and the implementation of the Enable NSW Going Circular Project.

CASE STUDY:

Intravenous to oral antimicrobial switch

Prolonged use of IV antimicrobial therapy to treat severe infections is common. Unnecessary prolonged use can lead to patient harm, increased risk of antimicrobial resistance and healthcare associated costs. Best practice recommendations are for processes to flag safe early IV to PO switch for antimicrobials.

One of the 2022/23 Sustainable Futures Innovation Fund project teams developed and implemented a clinical decision support tool to triage prescribed IV antimicrobial orders for a post-prescription review. The Antimicrobial Stewardship team and pharmacists are alerted to these orders when a patient meets the algorithm, pre-defined by the Clinical Applications Advisory Group for AMS. The indications list included respiratory, intraabdominal, and urological infections.

The project resulted in a 1.7-fold increase in accepting AMS recommendations to switch IV to PO, when compared to 2022. When an appropriate IV to PO switch occurred, there was a reduced Length of Stay.

CASE STUDY:

Net Zero Respiratory Leads – Inhale, Exhale

More than 20 million respiratory inhalers are prescribed annually in Australia. While inhalers are essential for managing respiratory illnesses, single pressurised meter dose inhalers also have a substantial carbon footprint.

For example, some pressurised meter dose inhalers emit as much carbon dioxide as a car trip from Sydney to Canberra.

Sophie Timmins, Respiratory and Sleep Medicine Physician, and her fellow Net Zero Leads at Royal North Shore Hospital tackled this issue. One of the initiatives was an inhaler collection pilot, which led to a 12-month inhaler and medication blister pack recycling program.

“Through an audit, we identified high-use wards and collected 122 inhalers over eight weeks, many with remaining doses,” she said. “The new recycling program will introduce designated bins for empty blister packs and inhalers in inpatient wards, which we are hoping to roll out across the district if successful.”

The team developed a staff educational campaign to ensure the correct disposal of inhalers and developed an asthma pathway for the Royal North Shore Hospital emergency department.

Land and buildings

Above: Northern Sydney Local Health District, NSLHD staff enjoying the green space at the Royal North Shore Hospital campus

Outcome statement

Supporting healthy people and places by decarbonising the design, construction, use and disposal of our buildings; and being stewards of our land and waters.

Governance and delivery

Why is this important?

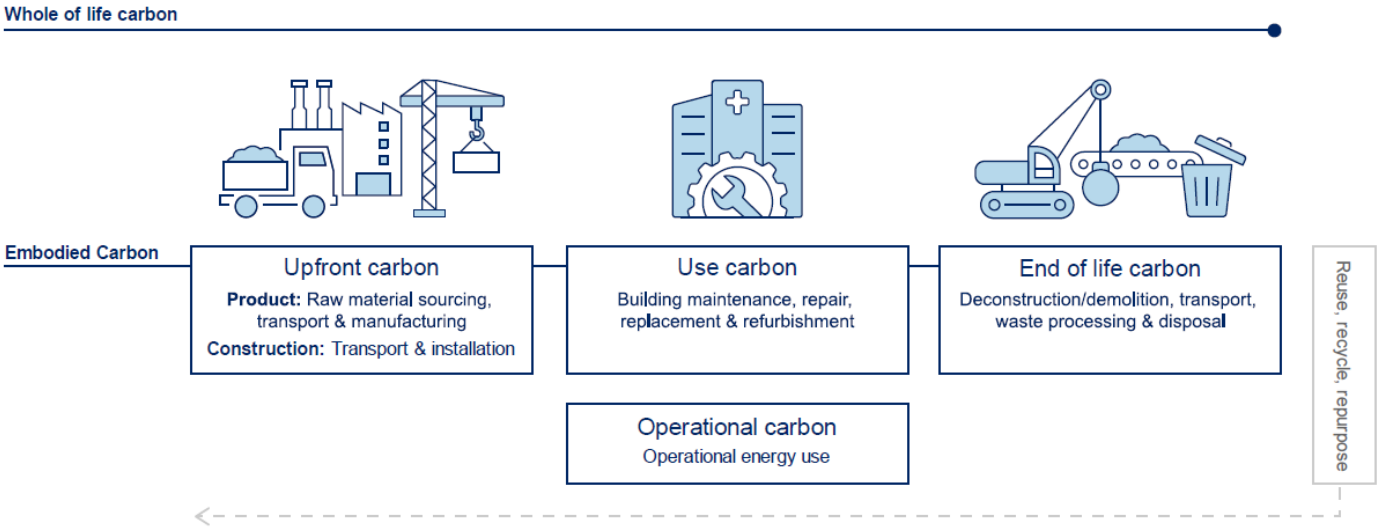
Policy context

The Net Zero Government Operations Policy includes a range of actions which are relevant for NSW Health buildings. The Policy requires agencies to align with Green Star certification standards for buildings and fit-outs above $10 million. Health Infrastructure is working towards aligning with Green Star certification standards in the planning for future projects. From 1 July 2026, all new office buildings commissioned for or by the NSW Government must be all-electric and all-electric office buildings will be preferred for new leases in Greater Sydney. By 2035, all office buildings owned or leased by the NSW Government must be all-electric. Green Lease targets must be included in all new and renewal lease transactions where the NSW Government will occupy a total of at least 4000m^2 of office space in a single building for a minimum three-year lease term. All other new non-residential buildings commissioned for or by the NSW Government must be able to operate without fossil fuels by 1 January 2035. When reaching end-of-life. and where feasible, agencies must replace gas-fired plant and equipment with electric or other fossil fuel alternatives by 2035, or earlier if cost effective.

In 2025 NSW Health will investigate the feasibility of rolling out an energy and water performance tool, such as NABERS[5], across all health facilities. The Policy also requires all new and existing government owned and leased office buildings to achieve and maintain minimum NABERS ratings. This also applies to government-owned data centres where they are suitable for rating.

The Decarbonising Infrastructure Delivery Policy (effective April 2025) applies to all NSW government building projects over $50 million and ensures upfront carbon emissions generated during the production of materials and construction is a key consideration across all project stages. The Policy also provides a mechanism for consistent measurement of upfront carbon across government projects using Infrastructure NSW's Embodied Carbon Measurement for Infrastructure Technical Guidance. Alongside the Decarbonising Infrastructure Delivery, the Protection of the Environment Policy (Sustainable Construction) enacts the reporting requirements of the former and is expected to be finalised late 2025.

Since 1 October 2023, the NSW Government's Sustainable Building State Environment Planning Policy has applied to new non-residential developments over $5m or alterations/additions over $10m. Under this policy, projects need to consider energy efficiency, passive design, measurement and reporting of embodied emissions and other sustainability requirements. Certain State Significant Development Applications (SSDAs) are also required to prepare a Net Zero Statement, which demonstrates how a building is either being delivered as fossil fuel free or will transition to being fossil fuelree by 2035, with additional information required regarding renewable energy generation and storage and energy efficiency measures.



Whole of life carbon

The Australian health system produces 7 percent of the country's carbon emissions with the construction and operation of infrastructure being a major contributor. Embodied carbon in buildings made up 16 percent of Australia's built environment emissions in 2019[6]. Without action, upfront emissions (including construction and product stage emissions) from infrastructure are projected to account for the majority of infrastructure emissions.

NSW Health LHDs, SHNs and Health Infrastructure are committed to taking decisive steps to lower carbon emissions across the health asset base. NSW Health buildings are designed to be places that heal. They enhance clinical service delivery and patient wellbeing, create supportive environments for workers and visitors, and provide public space and connectivity. As we move forward, health buildings must be designed in ways that support a reduction in operational energy and waste, as well as reduce the upfront carbon within the building materials.

New buildings and redevelopments

Health Infrastructure has taken steps towards tackling this challenge as outlined in its Sustainability Commitment.[7] In order to identify carbon hotspots, Health Infrastructure undertook a whole-of-life carbon analysis of the Ryde Hospital Redevelopment. It found embodied carbon was responsible for almost two-thirds of the carbon emissions of the building.

It clarified that, for new hospitals and other facilities, the key opportunity for reducing upfront and embodied carbon is via structural design and lower carbon materials, with additional opportunities in interiors and building services.

In 2023, Health Infrastructure released updated guidance and minimum sustainability requirements for all capital projects. Requirements call for:

- Project-specific sustainability plans developed as part of master planning and is updated throughout construction.
- Energy efficiency targets and renewable energy solutions.
- Full electrification of new builds.
- Climate risk assessments conducted early in project planning and via consistent methodology with a climate adaptation plan for risks above a certain level.

With new legislation coming into effect, these requirements will increase over time with an update to HI's guidance expected in 2025 to align with a shift towards Green Star certification for projects in line with the Net Zero Government Operations Policy requirements.

In 2023, Health Infrastructure, in partnership with Government Architect NSW, developed the Design Guide for Health: Spaces, Places and Precincts.[8] The Design Guide confirms the importance of good design, master planning, site selection, and careful specification of systems and materials in reducing embodied and operational carbon in health infrastructure.

Health Infrastructure is currently expanding its carbon data collection, analysis and reporting systems, to ensure carbon considerations inform building design and engineering decisions at the outset of projects, where they have maximum impact.

Health Infrastructure is also working closely with health, government and industry stakeholders to stay across developments and innovation and ensure that the building decarbonisation approach adopted by NSW Health continues to align with government-wide and industry practices and provides consistency of approach for delivery partners.

Health facilities and hospitals in construction are at various stages of becoming fully electric, installing solar systems and EV charging infrastructure, supporting waste minimisation and trialling low carbon materials, such as low carbon concrete. Projects that will feature significant sustainability initiatives when they become operational in 2025-26 include John Hunter Hospital, the Sydney Children's Hospital Randwick, the Children's Hospital at Westmead and the Wentworth Health Service Redevelopment.

Other projects currently in design will also integrate energy and water minimisation, decarbonisation and waste innovation. Renewable energy and climate resilient design features will be prioritised throughout the asset lifecycle. Health Infrastructure is working closely with government and industry partners on longer term initiatives such as the reuse and repurposing of assets and materials, and the broader application of low carbon and recycled materials.

What we learnt from the consultation

The consultation process confirmed what is working well in the system and identified priorities and areas that require improvement.

What is working well

Initiatives that are reducing health system emissions associated with the construction of buildings and infrastructure, include:

- Greening urban spaces by increasing tree canopy and green cover across Greater Sydney, delivers benefits for patients, visitors, and the local community—while also helping to mitigate the impacts of urban heat. One example is the partnership between Western Sydney Local Health District and Landcare NSW, which brought together a dedicated team of volunteers to plant more than 3,110 trees at Westmead Hospital.
- Design guidance which prioritises Environmentally Sustainable Development and the delivery of future focused sustainable infrastructure.
- Community, consumer and staff participation and engagement in service planning and design, ensuring all facilities are fit-for-purpose and focused on futureproofing.
- Innovations involving recycling healthcare products into new products, for example the transformation of healthcare textiles (scrubs, polos) into green ceramic tiles led by Hunter New England Local Health District, in partnership with Noveco Surfaces; increasing the use of recycled materials in healthcare buildings.
- Initiatives that reduce waste through recycling furniture and medical equipment, for example the Waste Action Reuse Portal pilot, led by South Western Sydney Local Health District (SWSLHD) which has repurposed $53,000 worth of district assets and diverted more than 65 tonnes of waste from landfill.
- Investment in infrastructure that supports rainwater capture, storage (e.g. tanks) and reuse across NSW Health facilities. For example, the reuse of reverse osmosis plant reject water to flush hospital toilets at Tamworth Hospital which saves 2.5 million litres of clean water per year.

- Establishment of gardens to support staff and patient wellbeing, for example the newly established vegetable garden and play area at Ellimatta House providing Child and Adolescent Mental Health Services within Mid North Coast Local Health District. The space supports children and teens with complex needs to be outside in a comfortable space and engage with mental health clinicians.
- Improved end-of-trip facilities that provide staff access to shower facilities, change rooms, secure bicycle storage and e-bike charging infrastructure to assist with reducing transport related emissions.

What will be different in 2030

- Further collaboration with the NSW Government and key stakeholders to continue to green infrastructure and urban landscapes at local and precinct scales. The initiatives reduce urban heat impacts, stormwater pollution and run-off, and improve habitat and connection to nature.
- Collaborating with the NSW Government and key partners, including Transport NSW, to continue to provide access to public transport and active travel corridors while shifting to a low-carbon future, including the provision of appropriate charging infrastructure for low-emission vehicles.
- Continuing to develop guidance to strengthen climate risk assessments and adaptation planning. Enhancing adaptive capacity and strengthening resilience across all NSW Health organisations.
- Update design guidance which includes specifications to reduce embodied and operational carbon within health infrastructure.
- Future focused facility design which supports new models of care (including virtual care), service changes and optimised asset use.
- Replacement of existing gas-fired plant and equipment with electric or fossil fuel alternatives, where cost-effective.
- Deeper engagement with Aboriginal people in building design, construction, land use and management processes to strengthen knowledge and culture sharing. There is growing recognition that the principles of stewardship and caring for Country will be critical in our transition to a high quality, environmentally sustainable and climate resilient health system.
- Adopting a circular economy approach and embedding circular design principles across all stages of the asset life cycle from pre-design, design, procurement, construction, through to post-construction; keeping materials in use for longer and preferencing products containing recycled content.
- Design planning that applies waste hierarchy principles to avoid and reduce waste and supports appropriate waste segregation, collection and storage, for example recycling, organics and e-waste streams.

Supporting initiatives

CASE STUDY:

Wentworth Health Service Environmental Initiatives

The $30 million Wentworth Health Service Redevelopment will provide a purpose-built facility with a comprehensive 19 bed inpatient unit and urgent care outpatient services for the residents of Wentworth and neighbouring communities in Far West NSW. Maximising the facility's connection to Country and environmental sustainability are key features of the design.

Upon completion, the project will achieve the following key environmental sustainability initiatives:

- Full electrification with 90kWh of solar panels on site.
- A 100% backup power generator will be provided to ensure power supply security.
- 56MWH of energy was saved through the installation of energy efficient lighting, HVAC systems, and high-quality passive design construction.

CASE STUDY:

John Hunter Health and Innovation Precinct Environmental Initiatives

Tangible environmental outcomes are at the heart of the $835 million John Hunter Health and Innovation Precinct (JHHIP). This project will greatly increase capacity for critical care in the Hunter New England Local Health District and is scheduled for completion in 2027. By integrating innovative and responsible environmental practices at every stage- from design and construction to ongoing hospital operations, Health Infrastructure and the Hunter New England Local Health District.

Some of the key environmental sustainability initiatives include:

- The new Acute Services Building will be one of Australia's first all-electric hospital buildings.
- Nearly 90,000 tonnes of natural fill material and 1,500 tonnes of other waste materials have been recycled and diverted from landfill.
- A whole of life carbon assessment was completed in the design phase.
- Water-sensitive urban design features have been incorporated to minimise run-off, with a 120,000L storage tank installed to capture rainwater.

CASE STUDY:

Ryde Hospital Redevelopment whole-of-life carbon study

In 2023, Health Infrastructure partnered with NSW Office of Energy and Climate Change (now the DCCEEW), NSLHD and Arup to analyse the carbon footprint of the Ryde Hospital Redevelopment and suggest decarbonisation opportunities for future capital projects. It found the project's carbon emissions were made up of 57% embodied (of which 29% was upfront carbon); and 43% operational.

The study demonstrated that:

- The biggest reductions in upfront and embodied carbon will come from structural design initiatives, such as:
  - material efficiency: using less material, i.e. shorter spans for beams and more columns with lower thicknesses.
  - material substitution: using different materials, i.e. low carbon concrete, timber, etc.
- Development of low carbon concrete and material substitution is essential, and NSW Health and Health Infrastructure will need to work with industry to support innovation in these technologies.
- Electrification, energy efficiency and renewable energy initiatives will also be required to achieve the net zero goal.

Since November 2023, Health Infrastructure projects have been required to capture information relating to the upfront and embodied emissions associated with the delivery of infrastructure. As a baseline of emissions data is collected for health assets over the next 12 to 18 months, carbon reduction targets will be able to be set for new projects in the future.

CASE STUDY:

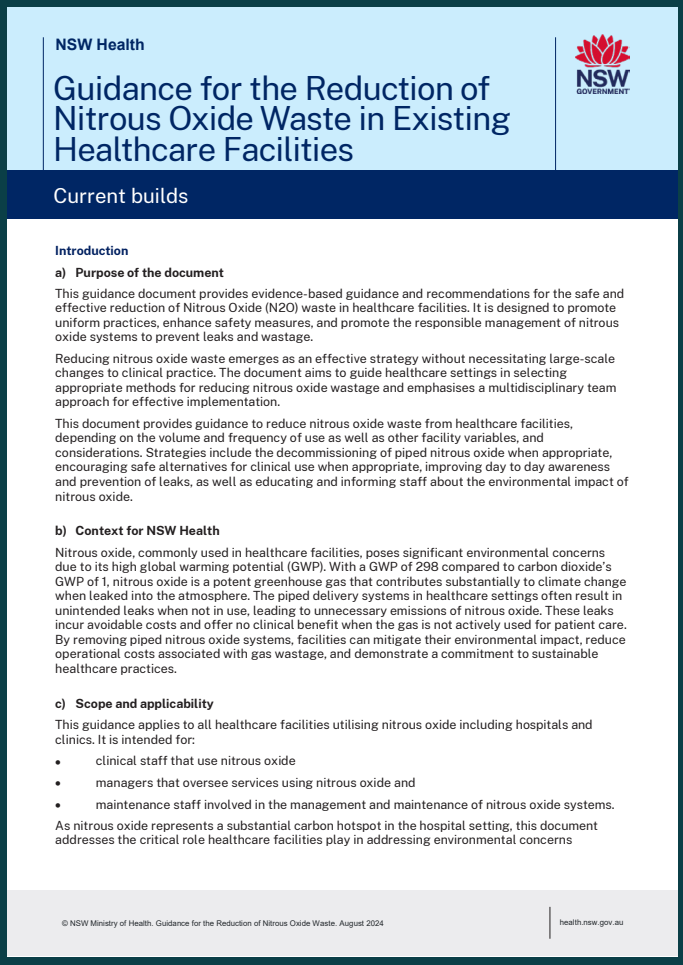
Guidance for the Reduction of Nitrous Oxide Waste in Existing Healthcare Facilities.

The Ministry of Health in collaboration with the Nitrous Oxide Expert User Group, have developed a comprehensive guidance paper on the Reduction of Nitrous Oxide Waste in Existing Healthcare Facilities: Current Builds.

The paper provides evidence-based recommendations for the safe and effective reduction of nitrous oxide waste in healthcare facilities. Strategies include the decommissioning of piped nitrous oxide when appropriate, encouraging safe alternatives for clinical use when appropriate, improving day to day awareness and prevention of leaks, as well as educating and informing staff about the environmental impact of nitrous oxide.

This paper addresses existing hospitals, with a complementary guide for new builds to be released in 2025.

The Expert User Group was established to address nitrous oxide waste in healthcare settings. The group comprises representatives from diverse disciplines, including anaesthetics, paediatrics, midwifery and obstetrics, oral health, and emergency services as well as from engineering departments, capital works, Health Infrastructure, Clinical Excellence Commission, Agency for Clinical Innovation, and the Ministry of Health.



NSW Health

Guidance for the Reduction of Nitrous Oxide Waste in Existing Healthcare Facilities

Current builds

Introduction

a) Purpose of the document

This guidance document provides evidence-based guidance and recommendations for the safe and effective reduction of Nitrous Oxide (N20) waste in healthcare facilities. It is designed to promote uniform practices, enhance safety measures, and promote the responsible management of nitrous oxide systems to prevent leaks and wastage.

Reducing nitrous oxide waste emerges as an effective strategy without necessitating large-scale changes to clinical practice. The document aims to guide healthcare settings in selecting appropriate methods for reducing nitrous oxide wastage and emphasises a multidisciplinary team approach for effective implementation.

This document provides guidance to reduce nitrous oxide waste from healthcare facilities, depending on the volume and frequency of use as well as other facility variables, and considerations. Strategies include the decommissioning of piped nitrous oxide when appropriate, encouraging safe alternatives for clinical use when appropriate, improving day to day awareness and prevention of leaks, as well as educating and informing staff about the environmental impact of nitrous oxide.

b) Context for NSW Health

Nitrous oxide, commonly used in healthcare facilities, poses significant environmental concerns due to its high global warming potential (GWP). With a GWP of 298 compared to carbon dioxide's GWP of 1, nitrous oxide is a potent greenhouse gas that contributes substantially to climate change when leaked into the atmosphere. The piped delivery systems in healthcare settings often result in unintended leaks when not in use, leading to unnecessary emissions of nitrous oxide. These leaks incur avoidable costs and offer no clinical benefit when the gas is not actively used for patient care. By removing piped nitrous oxide systems, facilities can mitigate their environmental impact, reduce operational costs associated with gas wastage, and demonstrate a commitment to sustainable healthcare practices.

c) Scope and applicability

This guidance applies to all healthcare facilities utilising nitrous oxide including hospitals and clinics. It is intended for:

- clinical staff that use nitrous oxide
- managers that oversee services using nitrous oxide and
- maintenance staff involved in the management and maintenance of nitrous oxide systems.

As nitrous oxide represents a substantial carbon hotspot in the hospital setting, this document addresses the critical role healthcare facilities play in addressing environmental concerns

CASE STUDY:

NatureFix Wellness Zones

The NSLHD Healthy Built Environments team are transforming hospital green spaces into wellness places, with a digital initiative called NatureFix.

Access to nature has profound effects on health and wellbeing, including reducing the risk of developing diabetes, heart disease, high blood pressure, dementia, and loneliness that, over time, can directly benefit hospitals through reduced admissions and length of stay. However, it's not just contact with nature that's important – it's what we do in nature that matters more than the time we spend in it.

The NatureFix initiative provides evidence-led self-guided mindfulness audio routines that are customised to campuses so staff, patients and visitors can engage with the surrounding natural features. The NatureFix Wellness Zones have been installed at Hornsby Ku-ring-gai, Macquarie, Mona Vale and Royal North Shore Hospitals and the Adolescent and Young Adult Hospice at Manly.

CASE STUDY:

Creating a multi-use space dedicated to young people experiencing mental health issues

One of the 2022/23 Sustainable Futures Innovation Fund recipients, Nate Bennett, established a vegetable garden and outdoor play area at the mental health service in Elimatta House, located in Port Macquarie.

The project attracted interest from colleagues, volunteers and local businesses willing to help construct the garden and play area. The garden and play equipment are custom-made from recycled and upcycled local timbers and supplies.

The vegetable garden also includes a clever composting system to reduce food waste from the facility.

The introduction of the outdoor area allows children to play in a familiar environment and interact within a less intimidating space while they are engaged with clinicians. The Grow and Play project facilitates the uptake of healthy behaviours and is already making a difference to young clients and families.

Energy and water

Above: Solar panels on Lightning Ridge Multi-Purpose Health Service, Western NSW Local Health District

Outcome statement

Improving air quality and health by using our natural resources (energy and water) in sustainable ways, including transitioning to clean renewable energy.

Governance and delivery

Why is this important?

Energy

The Net Zero Government Operations Policy sets a range of actions for NSW Health targeting scope 2 emissions, renewable energy, energy efficiency and demand management. It outlines requirements for the health system to investigate the feasibility of demand response in our operations, support the bulk purchase of renewable electricity, consider opportunities to host grid-scale renewables (including rooftop solar PV) and electrify operations and equipment. In line with Green Star certification requirements, future certified NSW Health Facilities will need to be powered by 100% renewable energy, including Green Power. All gas-fired plant and equipment must be replaced with electric or fossil fuel free alternatives at end of life, or earlier if cost effective.

The NSW Government has committed to delivering a reliable, affordable, and sustainable electricity system and using its purchasing power to leverage more large-scale storage energy projects, driving investment in infrastructure, and supporting more renewable energy to enter the grid.[9,10] The transformation of NSW's electricity system to solar and other technologies will deliver substantial emission reductions and air quality improvements across NSW.[11]

The NSW Government has increased its solar on government buildings target to achieve 126,000 MWh a year of solar generation by 2024. NSW Health has installed over 20MW of rooftop solar generation capacity across our public hospitals.[12]

NSW Health's Solar for Hospitals campaign has delivered:

- more than 60,000 tonnes of CO2-e reduction and energy savings, equivalent to removing around 30,000 SUVs from the road
- 114 new resource efficiency projects and major energy-use upgrades
- 6.8 percent electricity generation potential from roof-top solar power
- enough roof-top solar to power about 9,700 Australian houses for a year.

Port Macquarie Hospital hosts Australia's first large-scale battery system at a hospital. The solar energy storage system allows the hospital to switch to stored energy during peak periods and send electricity back to the grid, generating revenue.

NSW Health aims to have nearly all lights converted to LED lights by 2030. LEDs are energy efficient alternatives using at least 75 percent less energy than conventional light bulbs.[12]

In situations where energy efficiency and solar opportunities have been maximised, energy contracts could be used to increase the availability of renewable energy and to purchase green power where necessary.

Water

NSW is already experiencing the impacts of climate change, including increasing droughts and extreme temperatures leading to water scarcity and unseasonal rainfall leading to flooding.[2,13] These climate impacts affect water quality, access, and sanitation, and are felt by our communities.

NSW Heath is already making significant investments in water resource management and water and sanitation programs to improve the security, reliability, quality, and resilience of the natural resource.[14] NSW Health's Environmental Health Branch works in collaboration with the Health Protection Network and Public Health Units across metropolitan and regional NSW to address the physical, chemical, and biological factors external to a person and the related factors that can potentially affect health.[15]

This includes the provision of safe drinking water supplies, recreational use of water, sewage management, public swimming pools, toxicology, microbial control, skin penetration industries, funeral industries, mosquito vector management, air quality, heatwaves, waste management, and basic hygiene.

Our system is partnering with stakeholders to investigate water efficiency, quality, and security strategies across our health care facilities. This includes trialling new sustainable technologies that reduce the impact on our waterways, marine life and reduce landfill. Together we are supporting the NSW Government's commitment to ensure that communities in regional and metropolitan NSW have the water they need to thrive, grow and enjoy—now and for future generations.[14]

What we learnt from the consultation

The consultation process confirmed what is working well in the system and identified priorities and areas that require improvement.

What is working well

There were many examples of what is working well to support sustainable resource use, including:

- Installation of rooftop solar PV on suitable NSW Health facilities, contributing to the NSW Government solar target. For example, within NSLHD solar panels have been installed at Hornsby Ku-ring-gai Hospital, Douglas Building at Royal North Shore Hospital, Mona Vale Hospital, Manly Adolescent and Young Adult Hospice, and Brookvale Community Health Centre; reducing energy consumption from the grid by 1,814,356 kWh, translating directly to a saving of $317,240 per year.
- Energy efficiency initiatives improving energy performance, such as replacement of old lighting with LED lights.
- Introduction of innovative technologies that support water conservation, for example, the installation of sensor taps within the Dubbo pathology laboratory.

What will be different in 2030

- Expansion of rooftop solar PV across NSW Health facilities, including monitoring and performance tracking.
- Assessment of NSW Health public hospital sites using the NABERS Energy and Water for Hospitals tool[5] and adoption of targets to improve portfolio performance.
- Increased procurement of renewable electricity (green power) by all NSW Health organisations.
- 100% conversion of NSW Health buildings with LED lights.
- Investing in water and energy efficient technologies and equipment, for example sensor lights and zero Global Warming Potential refrigerators, including electrification of gas fired equipment or upgrading equipment with fossil free alternatives.
- Improved resource (energy and water) data management supported by smart meters, enabling centralised monitoring of efficiencies and potential savings; aligned with the NABERS environmental performance requirements.
- Scaling onsite battery systems across NSW Health facilities. Investing in partnership with NSW Government and local councils, in particular in regional and rural areas, in battery projects that improve grid security and reliability.
- Investing in innovations that improve water security, reduce consumption and contamination; recognising that healthcare facilities consume large quantities of water, and that climate change is adding to existing water insecurity.

Supporting initiatives

CASE STUDY:

John Hunter Hospital rooftop solar

In December 2021, John Hunter Hospital became home to the largest single hospital rooftop photovoltaic solar system in Australia. The installation includes over 5300 solar panels covering 12,000 square metres of roof space. The system has a total generating capacity of 2.4MW or 2MVA (AC), supplying approximately 12 percent of the hospital's total energy requirement. The project was funded with a NSW Treasury loan through the NSW Government's Energy Efficient Government Program, which is open to all Government agencies.

CASE STUDY:

Orange Hospital rooftop solar

Orange Hospital is home to the second largest solar PV installation in any government facility in NSW with more than 3,300 rooftop solar panels installed on buildings across the Orange and Bloomfield Hospital campus. The system resulted in a reduction of almost 2,300 tonnes of carbon emissions each year, generating enough electricity to power the equivalent of around 500 homes.

NSW Solar for Hospitals program

NSW Health now has a total of nearly 20 megawatts of solar in its network, spread out on previously unused roof space. This covers the equivalent of about 20 soccer fields - or a large-scale solar farm if built as a ground-level system.

Solar energy has reduced NSW Health's electricity bill by $4.2 million a year, with projected savings of $15 million a year by 2030.

The program has already reduced carbon emissions by around 33,000 tonnes - the equivalent of removing about 18,000 cars from the road.

CASE STUDY:

Australia's first large-scale battery system at a hospital

Storing solar energy — and off-peak electricity from the grid — into an onsite battery system. The batteries at Port Macquarie Hospital, installed in 2021, is Australia's first large-scale battery system at a hospital.

The system allows the hospital to switch to the stored energy in the batteries during peak periods when electricity companies are charging their highest rates. The batteries can also send electricity back to the grid, selling it back to the energy companies during peak periods to generate revenue.

CASE STUDY:

Light Emitting Diode Upgrade

In 2022, NSLHD replaced 5000 lights with modern energy efficient LED lighting technology.

LED technology is currently the most commercially energy efficient way of providing artificial lighting. The LED replacement project results in ongoing waste reduction as LED lights last significantly longer and require less frequent maintenance.

The replacement of 5000 lights resulted in a carbon reduction of 2023 tonnes per year, equivalent to carbon produced by 477 average Australian homes, or taking 1065 cars off the road.

CASE STUDY:

CT switch for savings

Research shows that medical imaging has a substantial carbon footprint. Larger imaging modalities such as magnetic resonance imaging, angiography suites and computed tomography scanners use significant amounts of electricity. As Australia has the second highest number of CT scanners per capita in the world and 115 of these scanners are found in New South Wales public hospitals, switching off scanners at appropriate times, presents an opportunity for potential savings.

The CT switch off pilot project investigated potential carbon, financial and health service benefits of turning off a CT scanner when not in use. The project was conducted at John Hunter Hospital in Hunter New England Local Health District.

The project was successful in achieving energy, carbon and financial savings; over the course of one week, energy consumption was reduced by approximately 32%. This equates to 7,280 kWh saved annually. This energy saving was achieved by switching off the CT scanner when not in clinical use after hours. The pilot project saved approximately 5.5tonnes CO2e, which is comparable to the annual carbon footprint of two light vehicles. Two further sites within HNELHD are currently implementing this intervention.

CASE STUDY:

HealthShare NSW eWater Project

In an Australian first, HealthShare NSW (HSNSW) has partnered with eWater Systems to supply onsite generators in kitchens that produce sanitising and cleaning solutions using electrolysed water technology (eWater). eWater is an environmentally friendly and safe replacement for synthetic chemical-based cleaning and sanitising products. The technology uses salt, water, and electricity to produce sustainable cleaning, sanitising, and disinfecting solutions.

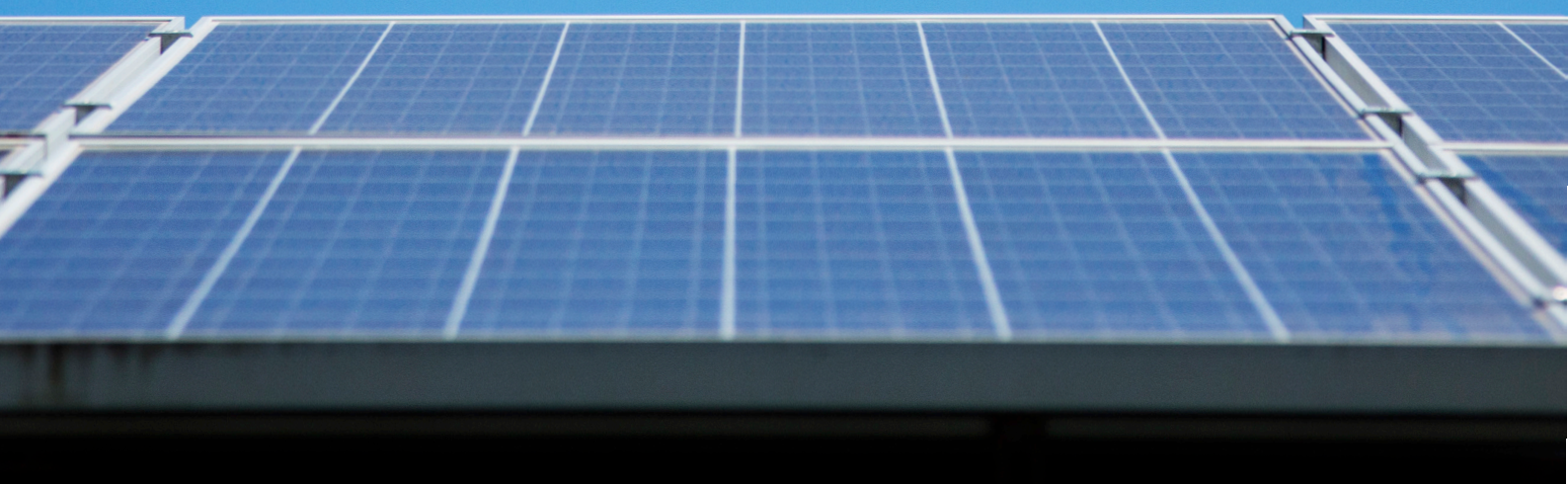
eWater is currently in use at over 120 food service sites, reducing chemical usage, handling, improving staff safety and reducing reliance on single-use plastics. The technology will be introduced to more than 160 public hospitals across NSW over the next three years.

CASE STUDY:

Dubbo Laboratory sensor taps

As part of NSW Health Pathology's commitment to environmental sustainability, the new Dubbo pathology laboratory was selected as a pilot site to install sensor taps. Led by Monica Mintern, the project conserves water and supports energy efficiency. Sensor taps create a hygienic and safe environment for staff and patients; removing the need to handle taps and reducing the chance of cross contamination.

The NSW Government has committed to delivering a reliable, affordable, and sustainable electricity system and using its purchasing power to leverage more large-scale storage energy projects, driving investment in infrastructure, and supporting more renewable energy to enter the grid.[9,10]



Supply chain

Above: Northern Sydney Local Health District, showcasing some of the Planetary Health team and NSLHD staff

Outcome statement

Reducing the environmental and financial costs of our supply chains, including the way we purchase goods and services, engage with our suppliers and drive circularity.

Governance and delivery

Why is this important?

Greening our supply chain

The Net Zero Government Operations Policy sets a range of actions for NSW Health targeting scope 3 emissions and circularity. By 1 January 2026, all agencies must have long-term net zero plans for their operations, including identification of their biggest scope 3 emission sources. From 1 January 2025, agencies must preference products that contain recycled content on an 'if not, why not' basis.

Under the NSW Waste and Sustainable Materials Strategy 2041, by 2030 we are required to achieve an 80% average recovery rate from all waste streams.

Around 70 percent of the health system's global emissions footprint is derived from the supply chain, including but not limited to the production, transport, and disposal of health-related goods such as medicines.[2] Supply chain emissions can materially impact the health, safety and wellbeing of communities.[2] Therefore, supply chain resilience is a precondition of a climate resilient health system.[2] This presents significant opportunities for NSW Health to collaborate with key stakeholders to reduce emissions in procurement and decarbonise our supply chain. Procurement policy is an important mechanism to support decarbonisation of health system supply chains.

By leveraging the purchasing power from the goods and services we buy from our partners and suppliers, we can influence emissions performance outside of our direct control. To achieve this goal, we will engage with our suppliers to improve and report on environmental performance, and the emissions footprint of products we purchase. Other jurisdictions, including the National Health Service in the UK, have developed roadmaps to support supply chain decarbonisation and supplier alignment with their net zero ambitions, supported by government procurement policies.[16]

To deliver against the NSW Government's net zero targets, we need to partner closely with suppliers, industry, government, regulators, and international partners to build sustainable and resilient supply chains.

Sustainable resource use

Single use plastic is a substantial issue in our economy and an acute issue in our healthcare system.[17] Legislation such as the *Plastics and Circular Economy Act 2021* which supports the phase out of single-use plastics, facilitates the reduction of problematic single-use plastic items, optimising our plastic resources and improving our understanding of the future of plastics.[18,19]

Several NSW Health organisations, including HSNSW, are already shifting away from single-use products and embedding sustainability in procurement decisions. NSW is starting to transition to a circular economy which involves minimising what we throw away and using and reusing our resources efficiently.[19]

What we learnt from the consultation

The consultation process confirmed what is working well in the system and identified priorities and areas that require improvement.

What is working well

There were many examples of what is working well to decarbonise health system supply chains, including:

- The NSW Government Procurement policy supports sustainable procurement and supplier diversity by encouraging partnerships with Small and Medium Enterprise, regional, and Aboriginal businesses.
- Collaborative supply chain ICT projects, including DeliverEASE and SmartChain Traceability which transforms consumable storeroom, stock management and item tracking across NSW hospitals.
- Investment in local innovation initiatives that support circular procurement practices and processes.
- Partnerships with companies that promote product stewardship and take back or recycle products to support diversion from landfill.
- Bulk product purchasing to reduce packaging and transport related emissions and transitioning towards carbon-neutral courier services.
- Early engagement with suppliers to support alignment with the NSW Government net zero targets.

What will be different in 2030

- Collaborating with consumers, carers and community members to increase their awareness of circularity products and principles; and elevate their participation in decisions regarding environmentally sustainable products and services.
- Leveraging NSW Health's purchasing power to partner with suppliers to align with the NSW Government net zero targets and sustainability ambitions.
- Promoting green procurement, sustainable resource use and product stewardship action. For example, developing a net zero supplier roadmap, including a supplier assessment process, aligned to international best practice.
- Increased measurement and public reporting from industry and suppliers on the environmental impacts of health products and technologies; across the entire lifecycle, including design through to end of life (waste).
- Collaborating with the suppliers and industry to support accurate and verified disclosures on the environmental performance of healthcare products.
- Investing in environmental performance and emissions footprint reporting (for example, life cycle assessments) and evaluations of health products (including consumables, devices and equipment), services or processes.
- Leveraging NSW Health's purchasing power, through procurement, contract and tendering processes, to incentivise circularity principles (product reuse and refurbishment), including increasing the demand for products containing recycled content.
- Investing in innovative technologies and solutions that support reusable product and equipment use, for example sterilisation technologies and equipment leasing arrangements.
- Product collection and recycling services, for products including pharmaceuticals, medicines, devices, medical and non-medical equipment.
- Collaborating with the Commonwealth, NSW Government, international bodies, industry and suppliers to decarbonise health system supply chains.

Supporting initiatives

CASE STUDY:

The Going Circular Project

EnableNSW's Going Circular pilot project focuses on developing a circular economy model for providing home respiratory equipment in NSW to reduce waste and carbon emissions.

The project team partnered with the Clinical Excellence Commission, clinical experts from Sydney Local Health District, SWSLHD and industry partners to develop and implement best-practice procedures and quality standards to clean and refurbish returned respiratory devices. Returned devices meeting quality and safety standards are added back to stock and re-issued to new patients in the community.

A survey for patients and clinicians is capturing feedback regarding perception of quality and acceptance of re-issued equipment. This pilot will inform EnableNSW's statewide model for equipment provision, with the potential to significantly reduce emissions and waste generated through the supply chain, keeping valuable products and materials in circulation for longer.

CASE STUDY:

Onelink team deliver emissions savings

HSNSW has embarked on a sustainable supply chain program. Departing from conventional methods of receiving medical supplies, the program involves direct container delivery from the manufacturer's factory to the NSW Health warehouse.

The trial significantly reduces intermediate handling, cutting down on forklift operations, truck kilometres and the use of pine pallets. By streamlining the delivery process, HSNSW has been able to maintain several months' worth of stock and improve supply chain resilience.

The trial has already achieved $2 million in savings in the first year. It is anticipated that the program will reduce truck travel by 23,872 kilometres and decrease pallet usage by 8,401 units.

Given the success of the trial, there are plans to expand the program. It's success stems from an effective collaboration with the supply chain partner, OneLink, and strong relationships with our suppliers.

CASE STUDY:

Sustainable Supplier Roundtables

In 2023, NSW Health engaged its leading suppliers from high-emission categories, including pharmaceuticals, medical equipment and waste management, in a series of roundtable discussions. This collaborative engagement aimed to identify barriers and explore opportunities for sustainable procurement in the healthcare sector, as a first step towards supply chain decarbonisation.

CASE STUDY:

Decarbonising healthcare supply chains

In April 2024, the Australian Government signed a public statement of collaboration with the United States and United Kingdom to decarbonise healthcare supply chains.

The initiative is led by the National Health Service in England and the United States Department of Health and Human Services. Other countries that have signed the public statement, include Ireland and Norway.

CASE STUDY:

NSW Health Circularity and Recycled Materials Action Plan

The DCCEEW established the Choose Circular funding for NSW Government agencies to complete activities to increase the use of NSW-priority recycled materials in procurement.

This is to support a requirement under the NSW Waste and Sustainable Materials Strategy 2041 for Government agencies to preference recycled content in purchasing, on an ‘if not, why not’ basis. NSW Health has successfully secured resourcing under the Choose Circular Fund to develop a Circularity and Recycled Material Action Plan to understand the measures that can be taken to improve their circularity and the uptake of recycled materials.

The NSW healthcare sector faces many challenges, including global supply chain volatility, material scarcity, decarbonisation targets, tightening healthcare budgets, growing patient requirements, and waste production. A shift to a circular economy could address these issues, through minimising waste, improving material circulation, and providing natural capital regeneration. Circularity positions the sector for innovative solutions to address systemic challenges, offering benefits including supply chain resilience, job creation and reduced operational costs.

CASE STUDY:

Outfits to Fitouts

The textile industry accounts for ~10% of the world's carbon emissions. It is reported that in Australia, 800,000 tonnes of textile waste is sent to landfill each year.[2]

In 2024, Hunter New England LHD partnered with Noveco Surfaces to recycle textiles (including scrubs, shirts, trousers, shorts, skirts, knitwear and outwear) into green ceramic tiles. These textile items are being diverted from landfill, and transformed into tiles that will be utilised in the new John Hunter Health and Innovation Precinct.

Five collection drives have been held at John Hunter for staff to recycle their old uniforms, with plans in place to expand uniform collection at other district sites.

Travel and transport

Above: Hunter New England Local Health District, Maitland Hospital EV charging infrastructure

Outcome statement

Improving air quality and health by reducing emissions from staff, patient and visitor travel. This includes shifting towards active modes of transport, electrifying our fleet (including ambulances), and exploring innovative ways to deliver care remotely.

Governance and delivery

Why is this important?

The Net Zero Government Operations Policy sets a range of actions for NSW Health targeting government passenger fleets. It outlines requirements for all new government passenger vehicles to be electric vehicles by 30 June 2030, within an interim target of 50% EVs by 30 June 2026. Emergency vehicles are currently exempt from the target.

Health research shows that exposure to traffic pollution is associated not just with heart and lung disease, but also with increased risk of strokes, neurodegenerative diseases, diabetes, some cancers and, in pregnant women, increased risk of low birth weight and premature babies[20]. Vulnerable people, including the elderly, children and those with chronic health conditions are at highest risk.

Fleet, staff, patient and visitor travel are significant contributors to our carbon footprint. Continued action to accelerate fleet electrification and sustainable travel strategies will reduce our emissions, improving air quality and associated public health benefits.[11]

Electrification of our fleet

The NSW Government's Electric Vehicle Strategy accelerates the uptake of EVs and commits to electrifying NSW Government passenger vehicle fleet.[21] The Strategy sets a target of electrifying all Government passenger feet. The transition to low-emission or zero-emission vehicles requires comprehensive charging infrastructure across our health care facilities.

NSW Health is supporting the NSW Government targets by retrofitting existing facilities, installing EV charging infrastructure at new facilities, and fitting EVs with technology that allows staff to schedule or book its use.[10] NSW Health will need to partner with facility owners to build EV charging infrastructure at leased facilities. NSW Health will reduce our impact through ongoing improvements in efficiency through logistics, digitisation, and IT. For larger vehicles such as vans, trucks and ambulances, NSW Health will explore a range of technologies (e.g. hybrid vs electric vs hydrogen cell).

Active travel

The health benefits of walking and cycling are clear: improved cognitive function, mental health, sleep quality, weight status, muscular and cardiorespiratory fitness as well as bone health. Physically active people have lower rates of anxiety and depression, cardiovascular disease, hypertension, hip fractures, type 2 diabetes, some cancers, metabolic syndrome and the risk of dementia. People who walk or cycle also have lower carbon footprints from all daily travel. At the population level, replacing motorised travel with walking or cycling, reduces vehicle exhaust and greenhouse gas emissions. Encouraging NSW Health staff, patients and visitors to shift towards active and public transport options, wherever feasible, will help improve health outcomes and decarbonise our health system.

The NSW Ministry of Health, in partnership with Local Health Districts, leads the development, statewide implementation and evaluation of prevention-focused programs and services that improve health and help reduce the burden of chronic disease.[22] The COVID-19 response has accelerated changes to the way we deliver care, including delivering care closer to home, and changing modes of delivery of medicines and medical supplies.

What we learnt from the consultation

The consultation process confirmed what is working well in the system and identified priorities and areas that require improvement.

What is working well

- There were many examples of what is working well to reduce travel and transport related emissions, including:
- Electrification and rationalisation of government passenger vehicle fleet from internal combustion engines to hybrid and electric vehicles.
- End of trip and storage facilities that encourage active travel among staff and patients; including bike storage and e-bike charging infrastructure.
- Flexible working arrangements and virtual education delivery to reduce staff travel and emissions.
- Adoption of innovative strategies, including SWSLHD 's Uber for Health pilot and HNELHD's eBikes as fleet vehicles pilot, supplementing government passenger vehicle fleets for more sustainable alternatives.

What will be different in 2030

- Investment in electrification of emergency vehicles (including net zero ambulances and patient transport vehicles), including supporting charging infrastructure and equipment, for example long-range batteries.
- Collaborating with the NSW Government and key partners, including Transport NSW and councils, to continue to improve public transport infrastructure; improving healthcare access and reducing health system emissions associated with staff and patient travel.
- Expansion of innovative travel and transport pilots, including electric bike fleets and drones, which support hospital and community service delivery.
- Improved promotion of public and active transport initiatives (e.g. walking and cycling) and establishment of active travel plans for NSW Health facilities, promoting sustainable (active and public), connected and reliable transport options.
- Improved availability of secure and reliable charging infrastructure across NSW Health facilities for staff and patients.
- Expansion and promotion of car-pooling and sharing arrangements for staff.

Supporting initiatives

CASE STUDY:

NSLHD’s commitment to net zero

NSLHD is committed to reducing transport emissions and achieving the District's net zero targets. As part of this commitment, six electric vehicle (EV) charging stations were commissioned at Macquarie Hospital in 2024, and ten EVs have been put into operation with community nursing and Mental Health services at Macquarie. The EV rollout will continue across the District as part of NSLHD’s ongoing sustainability efforts.

CASE STUDY:

Travel for the future

SWSLHD's Travel for the Future Strategy aims to create a more sustainable transport network by exploring the use of Uber for Health, consolidating pool vehicles at shared sites, utilising telematics data to identify opportunities for fleet reductions and installing electric vehicle chargers to support the existing and future electric vehicle pool.

SWSLHD has installed 17 EV chargers at Liverpool Hospital and commenced work on introducing a further 18 chargers at Campbelltown Hospital. These charging sites will create an EV travel corridor between Liverpool and Campbelltown Hospitals whilst providing opportunities to grow the Districts Electric Vehicle fleet pool.

CASE STUDY:

The Children's Hospital at Westmead Car Park Redevelopment

The state-of-the-art, eight-storey car park for the Children's Hospital at Westmead provides over 1,000 new parking spaces to meet the hospital's current and future parking needs.

The new car park's sustainable design includes 75 electric vehicle charging stations, with future proofing for 200 in total. Solar panels have been installed on both the roof and the façade; generating over 700kW of renewable energy.

The redevelopment also incorporates new landscaped areas, pedestrian pathways and playground improvements which support active travel initiatives.

CASE STUDY:

NSW Active Transport Health Model

Active transport plays a major role in addressing chronic disease, traffic safety and congestion, air pollution, and climate change.

In 2024, the NSW Ministry of Health, in partnership with Griffith University, the University of NSW and The George Institute, released a new Active Transport Health Model. The Model provides an evidence-based method for assessing the health impacts of active transport.[23]

The Model's standardised economic and social reference outcome values can be used by practitioners to calculate the costs and benefits of active transport initiatives.

CASE STUDY:

Gearing up for greener transport

Hunter New England LHD's Population Health team based at Wallsend Health Campus are gearing up for greener transport. They're swapping fleet cars for electric bicycles to attend meetings and appointments at frequently visited sites including John Hunter Hospital, Hunter Medical Research Institute, Calvary Mater Hospital and University of Newcastle.

The eBikes as Fleet Vehicle pilot project launched in 2024 aiming to reduce carbon emissions associated with staff travel and promote physical and mental health outcomes for staff. In addition, riding electric bicycles is expected to be time and cost effective compared to driving a car.

CASE STUDY:

Driving sustainability targets

On their journey to Net Zero, NSW Ambulance are upgrading their emergency vehicles to run on solar-powered energy.

NSW Ambulance Fleet and Equipment team designed a system to replace the lead-acid battery with a more environmentally friendly lithium battery to power several electrical components of the vehicles.

“This has involved solar panels being installed on the roof of the vehicles which charge the lithium batteries,” said Ols Duerr-Reuther, Associate Director Fleet and Equipment. The use of solar panels and lithium batteries is already reducing waste and keeping NSW Ambulance’s vehicles on the road longer and more often. So far, approximately 400 solar panels and 550 lithium batteries have been installed in ambulances and they are on the way to achieving a reduction of 2,000 battery changes per year.

The use of solar panels and lithium batteries is already reducing waste and keeping NSW Ambulance's vehicles on the road longer and more often.

Food services

above: HealthShare NSW, Shiralee Foodey, Chef at SWSLHD's Bowral and District Hospital

Outcome statement

The sustainable sourcing, production and provision of high quality, healthy food for patient healing and wellbeing, whilst minimising food waste.

Governance and delivery

Why is this important?

Food waste is a significant contributor to our carbon footprint. Wasting food, wastes money along with energy, water and other resources that are used to produce food.[26] Preventing food waste is the best outcome for the environment.

The Net Zero Government Operations Policy requires Government facilities, including the health system, to implement an organics waste collection service from 2026.

By focusing on more sustainable production, transport and disposal of food, and including more nutritious low-carbon foods, we can significantly reduce emissions related to agriculture, transport, storage, and waste.[2]

Food service reform in NSW

HSNSW's Food and Patient Support Services serve 24 million meals in 155 hospitals across the state every year.[28]

HSNSW are demonstrating a strong climate commitment to deliver improved patient experiences around food services, whilst reducing food waste. It has developed Food Service Design Principles which guide food service improvements and has partnered with several health organisations and key partners to drive food service reform that prioritises patient choice and flexibility.

What we learnt from the consultation

The consultation process confirmed what is working well in the system and identified priorities and areas that require improvement.

What is working well

There were many examples of what is working well to reduce food- related emissions, including:

- Introduction of new food service models (e.g. Project CHEF[29]) which focus on flexible, sustainable food service practices, enabling patients to order to appetite.
- Revision of the ACI Nutrition Standards that support LHDs, SHNs, healthcare facilities, clinicians and food service staff to create menus that are suitable for patients across NSW facilities; including consideration of sustainability principles within menu design and product procurement.
- Phasing out plastic products (single-use cutlery, plates and bowls) and adoption of reusable alternatives (e.g. metal cutlery), aligned with the Environmental Protection Agency's (EPA) Plastic Reduction and Circular Economy ACT 2021.
- Introduction of new Food Organics and Garden Organics waste streams within public hospitals, capturing and diverting significant amounts of food waste from landfill.
- Establishment of community and vegetable gardens on hospital grounds.

What will be different in 2030

- Investing in technologies that support order-to-appetite food service models that improve patient experience, menu choice, variety and reduce food waste.
- Organic waste from landfill. Food waste avoidance is the most effective strategy for reducing greenhouse gases and other pollution impacts of wasted food. Appropriate separation, collection/storage, transport and processing of food waste from public hospitals.
- Investigating the emissions impact of food waste recovery technologies. For example, the collection, transport, and processing of food waste into compost reduces emissions by 96% compared to landfill.
- Preferencing local supplier and onsite food preparation; reducing packaging and transport related emissions and delivering fresh and nutritious foods.
- Eliminating single-use plastic products and packaging, including single-use cutlery, plates, bowls, trays, jugs and cups.
- Regularly revising dietary guidelines to reflect population-level dietary changes, including transitions from animal-based foods to plant-based food groups (vegetables, fruits and cereals) and providing evidence-based recommendations to meet nutritional requirements.
- Collaborating with consumers, carers and community members to increase awareness of the connection between food and environmental impact, including actions that consumers can take to minimise the impact of their food choices (e.g. drinking water over sweetened or carbonated drinks, drinking tap water rather than consuming bottled water etc.).
- Collaborating with the NSW Government and key partners, to continue to invest in initiatives and campaigns that champion healthy foods and eating habits, including promoting local and seasonal foods.
- Partnering with key stakeholders and councils, including Aboriginal communities and businesses, to address food security impacts and improve access to nutritious and culturally appropriate food products. For example, expanding local vegetable gardens, including bush tucker gardens, that increase access to traditional foods.

Supporting initiatives

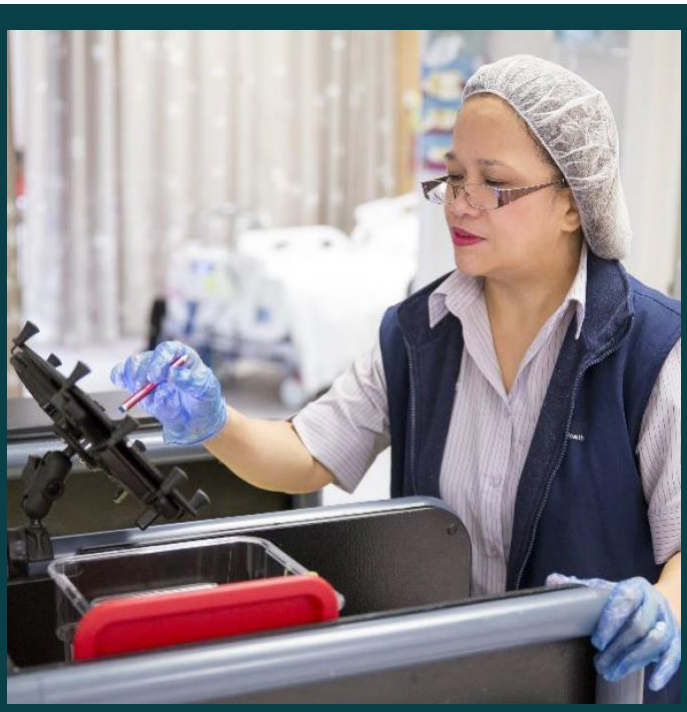
CASE STUDY:

Project Co-Designing Healthy and Enjoyable Food (CHEF) pilot at Bowral District Hospital

Project CHEF is a collaborative effort between HSNSW, SWSLHD, consumers, industry experts and expert advisory groups. Project CHEF was initiated to move towards a more patient-centred model of food services for public hospitals in NSW.[29]

The model focuses on flexible mealtimes, enabling patients to eat when they're hungry by submitting orders via their mobile device to a dedicated call centre. Patients also have access to a customisable menu where they can choose individual meal components. In addition to the changes in the kitchen, Customer Service has established a new, dedicated call centre team in the Newcastle Service Centre to process orders from the patients.

The Project CHEF model focuses on sustainable food service practices, with the pilot project decreasing food waste by 52% and improving patient nutritional outcomes: 17% increase in energy intake, and 18% increase in protein intake. The pilot project's success has helped inform other sustainable food service models including KidsCHEF.[30]



CASE STUDY:

NSW Health diversion and avoidance of food organics in hospitals

HSNSW partnered with the EPA to trial food waste processing technologies across 8 hospital sites including Mona Vale, Royal Prince Alfred, Wagga Wagga, Fairfield, Liverpool, Grafton Base Hospital, Mount Druitt and Blacktown.

HSNSW trialled 5 different types of food waste processing technologies including dehydration, maceration and liquidisation. The trial has influenced the way NSW hospitals dispose of their food waste and informed food service reform led by HSNSW.

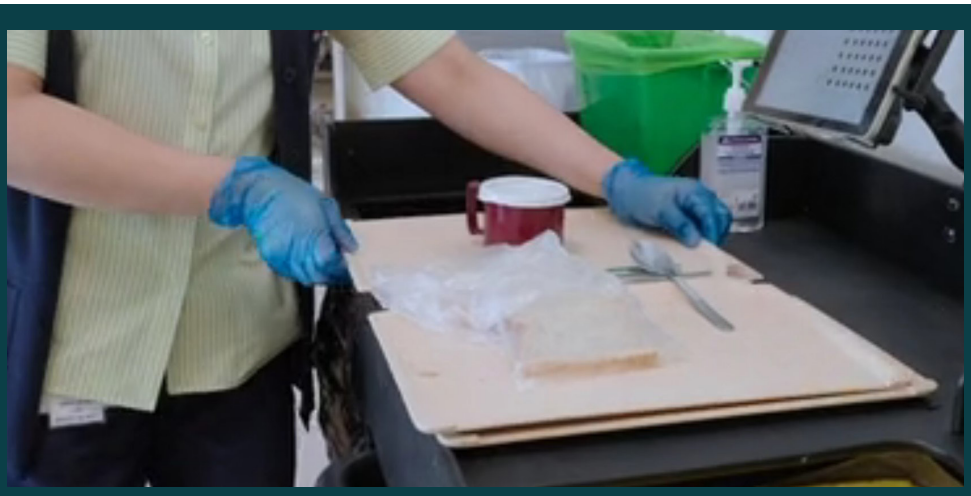
CASE STUDY:

Transforming food services for kids and their families

HSNSW and SCHN partnered to deliver a specialty paediatric model (KidsCHEF[30]) to improve patient experience around food services.

SCHN and HSNSW engaged with nutrition and dietetic staff, patients and food service teams to ensure that the model aligns with paediatric patient needs and delivers a range of food service improvements.

A set of new principles were developed and embedded into the redevelopment process. The principles focus on caring for kids and their families in a holistic way and transforming kids' health. The new principles sit alongside HSNSW'S Food Service Design Principles and guide food service improvement. The partnership focuses on ensuring that kids are being offered food that they want to eat and includes changes to mid-meal services.



CASE STUDY:

Rescued and Wasted Food: Hospitals Leading the Charge in Food Waste Reduction

In 2018, Queanbeyan Health Service's food service partnered with Veolia and GoTerra to deliver the RAW project. The project aimed to reduce food waste going to landfill by separating food waste at source. Previously, all food waste from the service went to landfill.

The team piloted the My Food Choice delivery model involving a bespoke meal collection trolley with separate bin infrastructure to support waste segregation. Food service staff collected and sorted the organic waste into biobags which was turned into high-quality compost and used by local farms, parks and gardens.

Since 2018, the project has diverted over 8,000kgs of food waste from landfill and saved over 14,000 kg of CO_2.

CASE STUDY:

Rehab2Kids worm farm

The Rehab2Kids department at Sydney Children's Hospital, Randwick has established a worm farm to help tackle the climate crisis by turning food waste into compost. The initiative is led by Pene Ingle, Clinical Nurse Consultant in Rehab2Kids. The farm aims to convert vegetable scraps into nutrient-rich worm castings and 'worm wee', providing valuable resources for gardening. The initiative has grown into a bigger, collaborative project, with families actively participating in the farm.

"Many families, especially those from rural or remote areas, also regularly engage with our courtyard garden and worm farms and assist with garden maintenance. It can be therapeutic for them and it's so lovely to have this community contribution." Pene said.

Rehab2Kids is one of the three specialised paediatric rehabilitation services in NSW prioritising sustainability within their department to create a better future for children. In addition to the worm farm, the department has embraced waste recycling and eagerly adapted eco-friendly behaviours like using keep cups and reusable water bottles, to foster a more sustainable workplace.

CASE STUDY:

Diverting food waste from landfill

At the beginning of 2024, the Royal North Shore Hospital introduced an organic waste stream to collect food waste from kitchens and on-site food providers.

Royal North Shore Hospital is working with HSNSW and Veolia as part of its efforts to divert food waste from landfill.

The hospital has embedded practice change within its kitchens. Food handlers are now placing food waste from the patient and retail kitchens into separate bins. They have also introduced garden waste and improved recycling and reporting of waste from the kitchens.

Currently, the organic waste is taken by Veolia to Soilco – a company that transforms organic waste into quality assured compost and mulch products. Since the beginning of the project, Royal North Shore Hospital has seen a 5% increase in diversion when compared to the average diversion for the 2022-23 financial year.

Climate risk

Why it's important

The Roadmap's purpose is to outline strategic priorities that reduce our health system emissions to 2030. However, an equally important part of our transition involves building health system resilience and enhancing our capacity to support health as we face a changing climate.

NSW has already warmed 1.4-1.6°C since the pre-industrial period, which is 1.4 times faster than the global average. This means we are living with climate change now.[13]

Without major action to adapt, conservative estimates from NSW Treasury modelling for the 2021–22 NSW Intergenerational Report found that even under a lower warming scenario of 2°C, NSW is likely to experience significant climate change risks into the future.[13]

National Adaptation planning

Ambitious and transformative adaptation is critical in the next decade to build resilience, minimise harm from climate change and maximise opportunity.[13]

The Australian Government's National Climate Resilience and Adaptation Strategy 2021–2025 highlights the important role of state and territory governments in adaptation, for instance through land-use planning, infrastructure, service delivery, health, emergency services, transport and environmental protection.[31,32]

The National First Pass Climate Risk Assessment and the National Adaptation Plan consider the effects of climate change on health, wellbeing, and health and social systems at a national level, including identifying health and social system hazards such as bushfires, drought, extreme heat, riverine and flash flooding and tropical cyclones.[31-34]

Priority populations

Whilst climate events will affect everyone, some population groups and communities are significantly more at risk of negative health effects associated with climate change; often it is also the same groups who have the least capacity to adapt.

The unique perspectives of these population groups and communities should be taken into account in assessing vulnerability, preparing for and responding to emergencies, increasing climate resilience and developing adaptation plans.[13] Responses to climate change need to take account of disparities in health outcomes through strengths-based approaches. Together, we can reduce these vulnerabilities, enhancing the resilience and wellbeing of our communities.[34]

Adaptation in NSW

The NSW Government's Climate Change Adaptation Strategy acknowledges the importance of early and effective adaptation for reducing/addressing the risks, costs and impacts of climate change.[13,31] The Strategy provides a framework that will strengthen and expand action to adapt to climate change now and over the long term, setting out key decision-making principles and objectives for adaptation, key priorities and a suite of actions.

In accordance with the NSW Government's Climate Risk Ready program, NSW Health is embedding climate change adaptation within decision making, in line with Priority 4 of the Climate Change Adaptation Strategy.

Climate-related Financial Disclosures

NSW Government entities will begin disclosing climate-related risks and opportunities alongside their annual reports. Disclosures are being implemented in three phases, beginning with the 2024-25 financial year, in line with annual reporting obligations. These disclosures will provide- transparency and help drive climate action.[33]

Acronyms

Acronym	Meaning
AMS	Antimicrobial Stewardship
CHEF	Co-Designing Healthy and Enjoyable Food
CT	Computed tomography
CPAP	Continuous positive airway pressure
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EV	Electric vehicle
EPA	Environment Protection Authority
ESD	Environmentally Sustainable Development
FOGO	Food Organics and Garden Organics
GHG	Greenhouse Gas (GHG) Emissions
GWP	Global Warming Potential
HACCP	Hazard Analysis and Critical Control Points
HFCs	Hydrofluorocarbons
HI	Health Infrastructure
HSNSW	HealthShare NSW
ICT	Information and Communications Technology
IV	Intravenous
LED	Light Emitting Diode
LHD	Local Health District
MRI	Magnetic resonance imaging
NABERS	National Australian Built Environment Rating System
NSW	New South Wales
NIV	Non-invasive ventilation
PO	Oral
PMES	People Matter Employee Survey
PPE	Personal protective equipment
PV	Photovoltaic
PAP	Positive airway pressure
PHN	Primary Health Network
RAW	Rescued and Wasted
SME	Small and Medium Enterprise
SCHN	Sydney Children's Hospitals Network
TGA	Therapeutic Goods Administration
WaSM	Waste and Sustainable Materials Strategy

Glossary

Term used in this document	Brief explanation
Adaptation	Actions undertaken to manage or reduce the adverse consequences of climate change, as well as to harness any benefits or opportunities.
Active travel/ modes of transport	Modes of transportation that support incidental physical activity and have low environmental impact, including walking, cycling, and using public transport.
Baseline carbon footprint	The total sum of an organisation's greenhouse gas emissions, measured to provide a starting point against which future emissions performance will be measured.
Carbon	Refers to carbon dioxide, a greenhouse gas contributing to global warming and climate change.
Circular economy	An economic model focused on minimising waste and keeping resources in use for as long as possible by reusing, repairing, refurbishing, and recycling existing materials and products. In the healthcare sector, this can involve sustainable procurement practices, waste management strategies, and initiatives to extend the lifecycle of medical equipment and supplies.
Climate change and health	The health of our planet is closely linked to our own health and wellbeing. Since health and wellbeing are closely linked to the health of our environment, changes as a result of climate change can affect our health and wellbeing. Vulnerable groups across our community are particularly at risk including people who are socio-economically disadvantaged; rural and geographically isolated communities; people with disabilities; children and older people; pregnant women and unborn children; and Aboriginal and Torres Strait Islander people. **More information:** Climate change and health - Climate (nsw.gov.au) and Climate impacts on our health and wellbeing | AdaptNSW
Carbon/ emissions hotspots	Processes or activities within an organisation that are significant sources of greenhouse gas emissions.
CO2 equivalent	The universal unit of measurement to indicate the global warming potential of each greenhouse gas, expressed in terms of the global warming potential of one unit of carbon dioxide. This unit is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.
Green power	Electricity generated from renewable sources such as solar, wind, and hydro, that have a lower environmental impact compared to fossil fuels.
Global warming potential	A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given greenhouse gas relative to one unit of CO2.
Greenhouse gases (GHG)	The seven greenhouse gases listed in the Kyoto Protocol—carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); nitrogen trifluoride (NF3); perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

Term used in this document	Brief explanation
Health promotion	Activities aimed at improving health and wellbeing by enabling individuals and communities to increase control over, and to improve, their health. **More information:** Health Protection NSW - Ministry of Health and Centre for Population Health - Ministry of Health (nsw.gov.au)
High-value care	Healthcare services that provide significant benefits to patients, focusing on interventions that are evidence-based and necessary, with good resource utilisation. **More information:** High value health care is low carbon health care - Barratt - 2022 - Medical Journal of Australia - Wiley Online Library
Low-value care	Healthcare services that provide little or no benefit, or even cause harm to patients.
Mitigation	Climate change mitigation includes actions we take globally, nationally and individually to limit changes caused in the global climate by human activities. Mitigation activities are designed to reduce greenhouse emissions and/or increase the amounts of greenhouse gases removed from the atmosphere by greenhouse sinks.
Net zero / carbon neutral	Balancing a measured amount of carbon released into the atmosphere with an equivalent amount sequestered, avoided or offset.
Net zero target	A defined goal set by an organisation to reduce its greenhouse gas emissions to net zero by a specific date, as part of its commitment to combat climate change and promote environmental sustainability. The *Climate Change (Net Zero Future) Act 2023* legislates the NSW Government net zero targets. **More information:** *The Climate Change (Net Zero Future) Act 2023* | NSW Climate and Energy Action
Primary prevention	Actions taken to prevent diseases or injuries before they occur, through measures such as healthy lifestyle promotion and vaccination.
Scope 1 emissions	Direct greenhouse gas emissions that occur from sources that are owned or controlled by an entity. For example, fuel burned on-site, fugitive emissions from refrigerants and medical gases.
Scope 2 emissions	Indirect greenhouse gas emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by an entity. Purchased and acquired electricity is electricity that is purchased or otherwise brought into an entity's boundary. Scope 2 greenhouse gas emissions physically occur at the facility where electricity is generated.
Scope 3 emissions	Indirect greenhouse gas emissions (not included in Scope 2 greenhouse gas emissions) that occur in the value chain of an entity, including both upstream and downstream emissions.
Solar photovoltaic (PV) systems	Technology that converts sunlight directly into electricity using panels made of semiconductor cells.
Sustainable Futures Innovation Fund	The Sustainable Futures Innovation Fund is a Secretary-led initiative providing up to $25,000 to support staff-led innovation projects that improve patient care and reduce our environmental footprint. **More information:** Sustainable Futures Innovation Fund - Climate risk and net zero (nsw.gov.au)
Virtual care	Any interaction between a patient and clinician, or between clinicians, occurring remotely with the use of information technologies.

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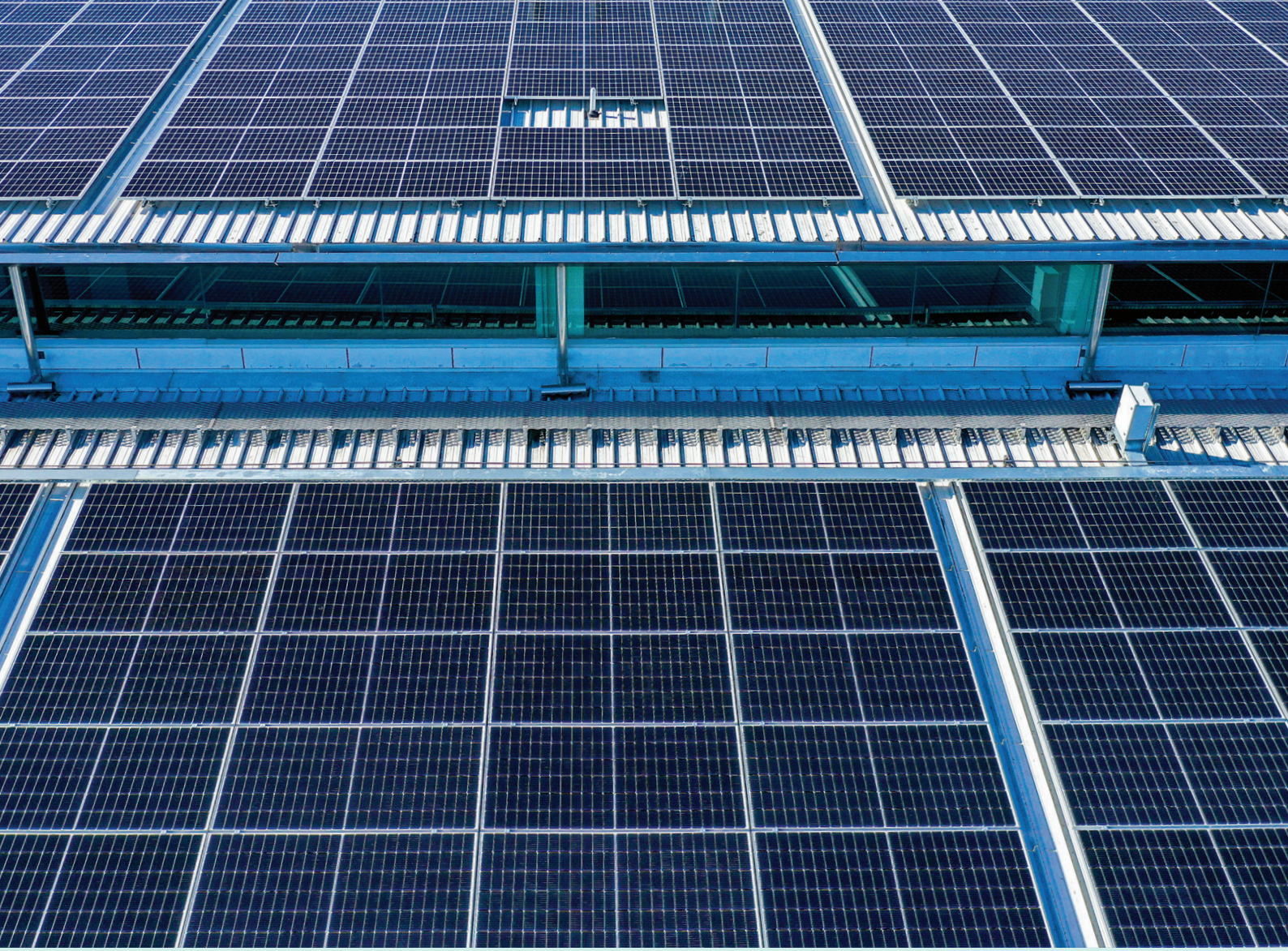

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