

CLIMATE ACTION ROADMAP 2025

NATIONAL ORTHOPAEDIC HOSPITAL CAPPAGH (NOHC)

1 INTRODUCTION AND PROGRESS TO DATE

- Founded in 1908, the National Orthopaedic Hospital Cappagh (NOHC) is the largest dedicated elective orthopaedic hospital in the country and is a recognised centre of excellence in treatment of related ailments and patient care.
- Currently, NOHC has a capacity of 136 beds, 5 major theatres and one minor theatre. With support and administrative facilities, the built-up areas total some 16,115sqm, comprised of buildings of varying age and physical condition.
- The campus comprises 11.6 hectares of land and has grown at need since its foundation. However, a masterplan, which is to become a Protected Development Control Plan (PDCP) has been put in place to ensure the future development of the hospital in a sustainable manner.
- Energy consumption in kWh for the years 2019 – 2024
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- is captured in the table below:

Year	2020	2021	2022	2023	2024
Electricity	1,941,589	1,967,034	1,892,706	1,834,263	1,854,091
Gas (HW & Heating)	3,900,291	3,699,522	3,424,453	2,877,313	2,785,110
Diesel (Ambulances)	20,135	20,450	20,328	17,150	15,181
Marked Diesel*	n/a	n/a	n/a	40,676	39,752
Total	6,310,711	6,121,886	5,337,487	4,769,402	4,694,134

* Marked Diesel, used in the diesel generators, lacks data on consumption prior to 2023 but will be recorded going forward.

- We have been actively working since 2021 with our Green Energy Committee and have a number of subcommittees in place working towards making NOHC's campus greener and more sustainable.

LEGAL REQUIREMENTS FOR ENERGY AND CLIMATE ACTION

As part of our Climate Action Roadmap, we recognise our legal and regulatory requirements as the following:

- 1) [Climate Action and Low Carbon Development \(Amendment\) Act 2021](#), which requires Ireland to achieve a 51% reduction in emissions by 2030 (relative to 2018 levels) and net-zero emissions no later than 2050; deliver annual climate action plans; implement a carbon budget programme; and define sectoral emissions ceilings
- 2) [SI393/2021 Energy Performance of buildings](#), which requires installation of Building Automation and Control by 2025, for buildings with HVAC rated output over 290kW; requires installation of electric vehicle charging points in car parks for new or refurbished buildings with more than 10 car parking spaces.
- 3) [SI381/2021 Clean Vehicles Directive](#), which sets targets for the procurement of clean light and heavy-duty vehicles, with the first target falling in 2025 and the second in 2030. The definition of clean vehicle changes to zero emission vehicles in 2025.
- 4) [SI4/2017 Energy Performance of Buildings](#), which requires all new public sector buildings built since 2018 to be "nearly zero emissions".
- 5) [SI646/2016](#), which requires that public bodies procure only energy using products and vehicles that are on the Triple E register.
- 6) [SI426/2014](#), which requires the public sector to demonstrate exemplary energy management and requires public bodies to undertake energy audits every four years.

- 7) Public Sector Climate Action Mandate, which highlights the main climate action objectives for public bodies.

Additionally NOHC is aligning with the [HSE Infrastructure Decarbonisation Roadmap](#), which identifies seven key action areas that will be progressed to put the HSE on course to achieve the targets set out in the Climate Action plan and to comply with its mandated obligations. The HSE Infrastructure Decarbonisation Roadmap builds on the approach to date to reduce the HSE's existing energy usage load and shift the HSE's use of energy away from fossil fuels towards renewable and carbon zero energy sources.

The seven key action areas are as follows:

Action Area 1	Continue and Enhance the HSE Partnership Agreement with SEAI and Develop Leadership Roles 22
Action Area 2	Regional Energy Bureau, Energy Management Teams, Green Teams and Shallow Retrofit Programme 23
Action Area 3	Energy Efficient Design (EED) Process Towards Carbon Zero Design (TCZD) 25
Action Area 4	Deep Energy and Carbon Retrofit Programme including Pilot Pathfinder Programme 27
Action Area 5	Metering, Modelling, Reporting & Energy Management Systems 29
Action Area 6	Behavioural Training and Learning 31
Action Area 7	Support to the Wider HSE Climate Action and Sustainability Strategy and Implementation Plan

As part of the ongoing work to reduce carbon emissions from buildings within the estate, the HSE have identified 10 healthcare sites where a Deep Energy and Carbon Retrofit Pilot Pathfinder Programme is being taken forward in partnership with the SEAI. Consultants have been engaged to progress designs and advise on retrofit works necessary to improve energy and emissions performance on these sites towards achieving the targets set out in the Climate Action Plan. This exercise will also assess and evaluate viable technical solutions which would be suitable for use in healthcare environments. This will also allow the HSE prepare an evidenced based, up-scaled and costed deep energy and carbon retrofit delivery programme for relevant buildings within the HSE estate. The outputs of this exercise will be used to inform similar projects at NOHC.

2 LEADERSHIP AND GOVERNANCE FOR CLIMATE ACTION

2.1 Governance Structure

- We have a Green Energy Committee, and a number of active subcommittees, with chairs to address specific areas and targets outlined in the Climate Action Plan.

2.2 Energy Performance Officer & Sustainability Champions

- NOHC Deputy CEO/COO is the nominated Climate and Sustainability Champion.
- The Head of Engineering is the nominated Energy Performance Officer (EPO).

2.3 Green Team Structure

- The Green Energy Committee is comprised of staff with the following designations:
 - NOHC Deputy CEO/COO (Committee Chairperson), **Aoife Gallagher**
 - Deputy Human Resources Manager, **Mary Doyle**
 - Therapy Services Manager, **Jacqui Givens**
 - P.A. Professorial Unit, **Ursula Gormally**
 - Hygiene Services Manager, **Declan Brennan**
 - IT Helpdesk Supervisor, **Owen McKeown**
 - PA to Director of Nursing (nursing representative), **Teresa Corcoran**
 - Catering Manager, **Andy Samuel**

- Catering Officer, **Janis Murphy**
 - Head of Engineering, **Martin Healy (EPO)**
 - Senior Facilities Engineer, **Shane Robinson**
 - Stores Manager, **Damien Gannon**
 - Stores Officer, **Stephen Shannon**
 - Laboratory Manager, **Marese Mullins**
 - Health Care Assistant, **Sarah Lawlor**
 - Clinical Specialist Radiographer, **Jonathan Suing**
 - Staff Nurse Thatre, **Aoife White**
 - HSE Energy Management Engineer, **Ciarán Finlay**
 - HSE Sustainability and Climate Office, **Robert Sweeney**
 - Project Consultant, **Colm Geraghty**
 - PA to DCEO/COO, **Fiona Dwyer**
 - Student body representative) **Dr Richard Downey, Lecturer**
 - Zehnacker Ireland Healthcare Representative, **Michael Hogan**
- The Subcommittees are:
 - Litter and Waste Management
 - Energy
 - Sustainable Travel
 - Sustainability Awareness and Promotion

Terms of Reference

- To address core sustainability issues including, but not limited to, energy, water, waste and transport.
- To develop a Register of Opportunities for NOHC with reference to potential sustainable programmes in the hospital.
- To develop and effect a Sustainability Programme in line with the Hospital's Strategic Plan 2022 – 2025.
- To effect NOHC's Climate Action Mandate and ensure all necessary resources are in place for same.
- To effect the Hospital's journey to becoming a Green Flag hospital.
- To communicate and promote NOHC's sustainability programme through education and awareness days.
- To deliver staff workshops on climate issues with a particular focus on decreasing NOHC's carbon footprint.
- To make recommendations to the EMT with respect to energy conservation and sustainability issues.
- To create and foster a culture of environmental and energy efficient best practice throughout the hospital.
- Serve as a forum to address specific sustainability issues.
- To perform an annual self-assessment to determine the effectiveness of the committee, the findings of which are reported to the CEO.
- The terms of reference shall be reviewed every two years from the date of approval. They may be altered to meet the current needs of all committee members, by agreement of the majority.

3 ENGAGING OUR PEOPLE

Staff Training, Events and Initiatives – 2024

- Optimising Power at Work – launched February 2024 – promotional stand in the restaurant and workshops held in the auditorium for staff and energy champions
- March 2024 – Green Week with specific focus on sustainable travel including promotion of bike to work, taxsaver scheme, carpooling,
- Annual Marchathon event held for month of March
- Ready, Set, Cycle initiative ran from 8th April – 17th May in conjunction with the National Transport Authority including a cycle challenge for two weeks in May

- In conjunction with the National Transport Authority, the Green Energy Committee launched an Employee Travel Survey to inform future sustainable travel initiatives in NOHC
- National Bike Week promotions from 11th – 19th May
- June 2024 – IBEC Public Sector Climate Action Mandate Workshop – attended by Green Energy Committee chair and shared with committee members
- June 2024 – Green Public Procurement Webinar – to be attended by Procurement Department and senior leadership
- July 2024 – focus on communications and events on elimination of single use items
- Annual Walktober event held for staff in 2024
- November 2024 – Climate Action Leadership Training – attended by Executive Management team and senior staff.

4 ACHIEVING OUR CARBON TARGET

4.1 Emissions

- Energy related carbon emissions baseline (average of 2016-18 emissions) were:

	Unit	Thermal emissions	Transport emissions	In-target electricity emissions	Total in-target emissions
Baseline emissions (2016-2018 average)	[kgCO ₂]	726,395.2	7,790.5	844,263.1	1,578,448.8

No growth in emissions between the baseline and target years based on planned increase/growth in services is anticipated.

4.2 Gap To Target

The Gap-to-Target model (GTT model) is a spreadsheet tool, generated by the SEAI, for use by public bodies to evaluate their Energy Efficiency (EE) performance and energy-related Greenhouse Gas (GHG) emissions over time, in accordance with SEAI's public sector energy Monitoring and Reporting (M&R) framework for the period to 2030 (M&R-2030).

The GTT model:

- Calculates the gap to the 50%-by-2030 Energy Efficiency (EE) targets, based on the 2009 Baseline, using the methodologies for this target.
- Models the gap to 2030 Energy Efficiency targets from historical to current usage of energy.
- Models the impact of different activity metrics, (e.g., patient numbers) on future energy performance at NOHC.
- Models the impact of implementing energy-saving projects on gaps to target towards the 2030 Energy Efficiency target.
- Calculates the gap to the 51%-by-2030 GHG reduction targets, based on the 2016-2018 baseline, using the methodologies for this target.
- Models the gap to 2030 GHG targets from historical to current GHG levels.
- Models future GHG emissions pathways (incorporating decarbonisation initiatives) and anticipated supply-side gains from electricity system decarbonisation and biofuel blending.

In the GTT model electrical energy is presented in two ways:

- Total final consumption (TFC): TFC is the energy consumption recorded on site meters and bills.

- **Total Primary Energy Requirement (TPER):** TPER is a measure of our energy consumption that also accounts for the energy that is consumed and/or lost beyond the boundary of our organisation, notably in generating and distributing the electricity that we use. TPER gives a more complete measure than TFC of the impact of the individual public body and the public sector as a whole on energy use and on energy-related CO₂ emissions.

NOTE: The GHG emissions cost for electricity generation, measured in kgCO₂/kWh, is decreasing as the national grid reduces its dependency on fossil fuels over time, with a 2030 target of 70% Renewable Energy Share in Electricity (RES-E). This is factored into the GTT calculations and models.

Analysis Of Significant Emitters: Boilers, which provide thermal energy, and Electrical Equipment are the most significant consumers of fossil fuels on-campus. Reliance on fossil fuels will need to be reduced in order to meet the 2030 GHG reduction targets.

Gap to Target for GHGs: Our in-target non-electricity emissions were 620,351.4 kgCO₂ in 2022 and 604,362.6 kgCO₂ in 2023. The gap to target between 2023 and 2030 is 244,611.0 kgCO₂, to reach 2030 emission targets of 359,751 kgCO₂. Gas usage has been reduced by 29% between 2018 and 2023. The overall carbon reduction target is 51% of the 2016-2018 baseline emissions. NOHC Has achieved 32.5% reduction on the baseline GHGs to date.

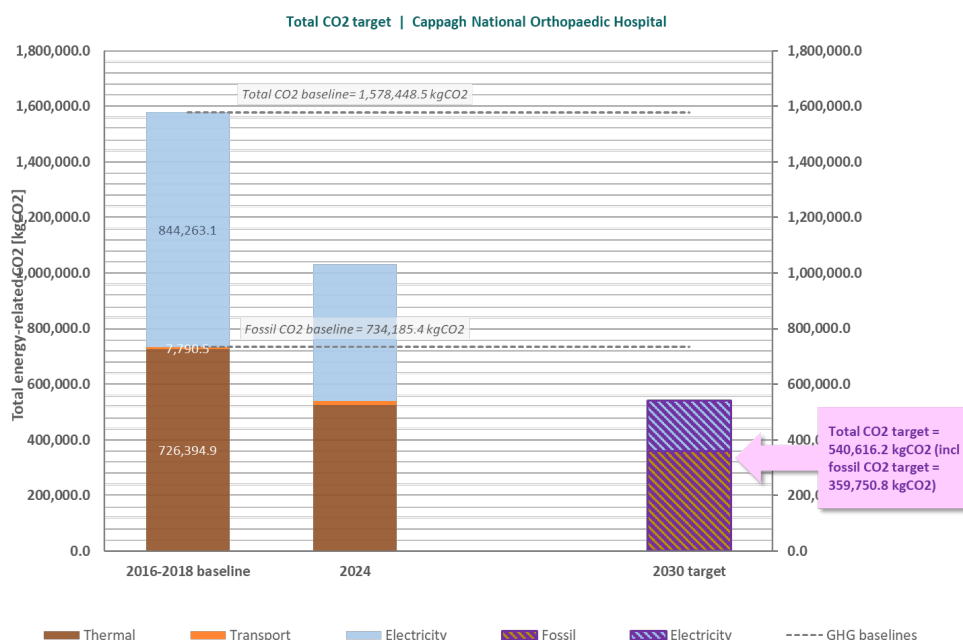


Fig 1. GHG Targets showing the Baseline and Targets for each Producer of GHGs onsite

4.3 Project Pipeline

Additional decarbonisation pathway(s):

Proposed actions to achieve energy carbon target: NOHC has developed a Development Control Plan (or Masterplan) for the campus, in which all buildings to be constructed will be compliant with the latest building regulations, meeting NZEB requirements, and designed with a pathway to zero carbon use for all energy sources by 2050. Phase 1 of this plan is under development now, with a number of options for consideration, and has a funding application that will be submitted by September 2023. All new buildings will use only electricity as an energy source, some of which will be from renewable sources onsite, ensuring a pathway to zero carbon by 2050 on decarbonisation of the national grid.

Additionally, the completion of Phase 1 will result in the decanting and decommissioning of a number of hospital areas ranging from 1123.14m² to 4469.63m², depending on the development option that receives funding.

These areas will not require refurbishment to bring them into compliance with the climate action targets laid down in [here](#) in this document, resulting in energy savings of 357,034 kWh to 1,420,847 kWh, depending on the development option that receives funding.

Planned energy related carbon reduction activities: Additionally, NOHC plans to undertake a comprehensive program of improvements to the energy performance for those legacy facilities to remain after the construction of Phase 1 and the decanting and decommissioning of areas which are no longer required. These works include:

- Upgrading gas fuelled heating systems to heat pump systems
- Improving the thermal performance of the building envelopes.
- Connection of remaining unconnected heating systems to the BMS
- Installation of solar PV panels on hospital buildings with a predicted output of 86,401 kWh p.a. This represents 10% of current load requirements and reduces our emissions by 40,586 kgCO₂.

Energy usage data for the winters of 2022/2023 and 2023/2024 showed the following decreases in building energy consumption in kWh, with a 8% reduction overall:

Winter Period	Gas Use	Electricity Use	Total Use
2022/2023	2,090,556	962,706	3,053,262
2023/2024	1,983,491	824,067	2,807,558
Difference	107,065	138,639	245,704
% Difference	-5%	-14%	-8%

Project readiness status: These projects have been scoped at a high level and NOHC is working with the HSE to secure necessary resources, and to schedule and execute the related projects.

4.4 Resources

Funding will be sought through the HSE for the various projects and professional services will be procured for designing and carrying out the works to be executed.

ACHIEVING OUR ENERGY EFFICIENCY TARGET

4.5 Gap To Energy Efficiency Target

Baseline: The 2024 Energy Saving was 48.7% against the 2009 baseline, where the 2030 target is 50%. NOHC 2030 Energy Savings Target is 50% against the 2009 baseline at a minimum. The construction of phase 1 of NOHC Masterplan will result in the decanting of a significant portion of the older facilities. The decanted facilities will not need capital refurbishment and as a result will net significant energy savings due to NZEB construction of the new building. Additionally, ongoing general refurbishment projects will reduce energy consumption further. Estimates for energy savings on all projects in the pipeline will be captured and recorded.

2030 Business as Usual (BAU) Energy Savings: 48.4%. This is without the inclusion of energy savings arising from refurbishments and other projects that target energy efficiency improvements. This will be adjusted once the projects' energy savings are calculated.

Significant Energy Users on-campus are the calorifiers for heating and hot water, CDU Boilers, and Lighting, along with other energy users such as pumps and extractors.

4.6 Energy Efficiency Actions

To address the gap, additional energy efficiency pathways have been developed and include equipment replacement (AHUs), automation and connection to BEMS (Extractor fans, AHUs, Chillers, etc.). Scheduling the powering up and down of equipment optimally is important, as well as staff awareness on the use of equipment in their areas of operation. Some projects have already been completed such as the replacement of AHU in theatres 3 & 4, and windows replacement is ongoing in ward areas.

Projects finished to date include:

- Full refurbishment of the convent building (insulation, glazing, heating system)
- Installation of high efficiency pumps on hot water and heating systems in the hospital
- Installation of Heat Pumps to replace gas boilers
- Installation of Zone Valves on heating system to enable shut off in areas not in use
- Installation of external insulation on the OPD/Nurses Administration block
- Connection of a large part of the heating systems to the BMS
- Replacement of lighting with LED systems
- Installation of automated doors, which will reduce heat loss.
- Window replacement in the Day Wards, St. Catherine's Ward and St. Theresa's Ward with energy efficient windows (75m² of glass), netted projected energy savings of 44,000 kWh = €4,000 p.a.

5 OUR WAY OF WORKING

5.1 Energy and Environment Management Systems (ISO 50000 or 14001)

Energy management is at the heart of all projects for new construction or refurbishment, with M&E systems being linked to a Building Energy Management System (BEMS) wherever possible. As existing systems are updated, these will also be linked to the BEMS.

Additionally, ISO certification (ISO 50000 or 14001) will be sought as we develop an overall energy and environment management strategy.

5.2 Digitisation of Processes

Once the format for digitisation has been decided by government, a project for conversion of hardcopy medical records to the approved softcopy format will be developed, funding sought, and executed.

5.3 Green Procurement

5.3.1 Green Selection & Award Criteria

All equipment is purchased through the EEE Register and all outgoing tenders have green procurement addressed as a requirement for suppliers.

5.3.2 Green Public Procurement Organisational Tracker

Under Circular 20/2019 all Central government departments are required to track and monitor their application of green procurement. The EPA have developed templates for monitoring and reporting on green procurement, which are available at the [EPA website](#). All tenders over the thresholds (€25,000/€50,000) must include green criteria from 2023 onwards. NOHC has already incorporated this into all tenders, and a record is kept for all such tenders issued.

5.4 Low Carbon Construction Methods

Provision will be made, through works contracts and design specifications, to ensure that materials used in construction and refurbishment projects are sourced from either renewable sources or from lower carbon production than those used previously.

5.5 Resource Management

NOHC has installed ten meters each for water and gas for to monitor usage in various locations around the campus. Each resource is monitored automatically on a central system with reading being uploaded every 15 minutes to allow for trend analysis.

5.6 Waste Management

NOHC has a comprehensive solid waste management system for the site with separation of recyclable, biodegradable, and nonrecyclable general waste, the latter being disposed of by weight. This exercise promotes separation and helps to limit dumping in landfill.

- From 2019 to 2024, NOHC has reduced the biodegradable waste output in catering per month by 47.6%:

Period	Total Biodegradable Waste (kg)
2024	9,352
2023	17,844
2022	17,009
2021	21,400
2020	23,166
2019	28,693

- From 2019 to 2023 the annual percentage of non-clinical waste going to landfill was reduced from 19% to 1.3%
- The Hospital commenced a project in May 2024 to reduce food waste per inpatient. Following implementation of various initiatives, the Hospital has reduced food waste in ward areas from 522g of food waste per patient to 325g per patient per day (-38%)
- Following a roll out of reusable keep cups for all staff, the Hospital purchased 61,000 less compostable cups in 2024 compared to 2023.

5.7 Paper

In 2023, the Green Energy Committee commenced internal campaigns to reduce paper usage where possible and switch to recycled A4 paper.

Since July 2024, the Hospital procures recycled paper as the default.

- Consumption of new and recycled print paper is shown in the table below

Size	No. of Reams July – Dec 2023	No. of Reams July – Dec 2024	Δ%
A4 – Standard Paper	984	121	↓88%
A4 – Recycled Paper	198	936	↑372%

- NOHC introduced a new Arthroplasty App in 2023 which provided an electronic format of patient information material, thus reducing, and eventually eliminating, the need for print material

6 IMPROVING OUR BUILDINGS

6.1 Display Energy Certificates

The services of a consultant have been procured to carry out a study to generate Display Energy Certificates (DEC) in every building ‘frequently visited by the public’.

6.2 Building Stock Plans

In 2022, NOHC updated a traffic light study and used it to generate high-level costs to improve the energy performance of existing building stock, through the development of a Building Stock Plan database. This has been further enhanced by determining which buildings will be decommissioned in the event of Phase 1 of the Masterplan for the Hospital proceeding, thereby avoiding an overspend. Strategies are under development for upgrades to building envelopes, replacement of obsolete heating systems and updates to control systems to improve efficiency in energy usage and reduce dependence on the use of fossil fuels on-campus. The database identifies and classifies all buildings onsite, and captures such data as building name, function, size, occupancy status and energy usage and emissions.

Over time, further information will be added to capture energy efficiency improvements to existing infrastructure, and decommissioning and replacement of building stock that cannot be made to comply with current building regulations and energy performance requirements. This will contribute to the national database and support effective tracking of progress toward our Climate Action Targets.

6.3 Bicycle Friendly Buildings

Secure, access-controlled Bicycle Parking (for 40 bikes) has been installed at NOHC to encourage the use of cycling as a means of transport to work. Additionally, the 'cycle to work' scheme has been promoted to encourage the use of alternative means of transport.

6.4 Non-Fossil Fuel Heating in New Builds 2023

All new builds are designed to support heat pumps as the primary source of heating and hot water. Refurbishments involving upgrades to heating are planned so that they are connected to a system that is zoned, modular and can be linked in with later upgrades to the same building.

6.5 Transport Procurement

Any vehicles procured will meet CAP21 target for purchase of zero emission vehicles where operationally feasible, as well as the minimum targets set out by SI381/2021 Clean Vehicles Directive.

7 MANAGEMENT/BOARD SIGN OFF

Signed:



Role:

Head of Engineering