CLIMATE ACTION ROADMAP 2023

THE NATIONAL ORTHOPAEDIC HOSPITAL CAPPAGH (NOHC)

Michael Giblin

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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 142 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 – 2022 is captured in the table below:

Year	2020	2021	2022
Electricity	1,941,589	1,967,034	1.892.706
Gas	3,900,291	3,699,522	3,424,453
Diesel	20,135	20,450	20,328
Total	**6,310,711**	**6,121,886**	**5,763,847**

- 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.

2 LEGAL REQUIREMENTS FOR ENERGY AND CLIMATE ACTION

As part of our Climate Action Roadmap, we recognise our legal 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 carparks 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.

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.

3 LEADERSHIP AND GOVERNANCE FOR CLIMATE ACTION

3.1 Governance Structure

- We have a Green Energy Committee, with a number of subcommittees with chairs to address specific areas for which action is needed to address Greenhouse Gases and Energy Efficiency targets.

3.2 Energy Performance Officer & Sustainability Champions

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

3.3 Green Team Structure

- The Green Energy Committee is comprised of staff with the following designations:
    - NOHC Deputy CEO/COO (Committee Chairperson)
    - Deputy Human Resources Manager
    - Therapy Services Manager
    - P.A. Professorial Unit
    - Senior Facilities Engineer
    - Hygiene Services Manager
    - IT Helpdesk Supervisor

  - PA to Director of Nursing (nursing representative)
  - Catering Officer
  - Lecturer (student body representative)
  - HSE Energy Management Engineer
  - Project Consultant
  - Zehnacker Ireland Healthcare Representative

- The Subcommittee are:

  - Communications
  - Energy
  - IT
  - Waste Management

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.

4 ENGAGING OUR PEOPLE

Through the Communications Subcommittee, a number of events and initiatives were organised in 2022:

- On March 18th, a Global Recycling Day was held to raise awareness. This was promoted widely to all staff. A quiz was held on the day of the event in the canteen with a prize for the winner.

- April 22nd, 2022 was Earth Day. This was used to promote a mass "switch off" of office equipment across the entire hospital, in preparation for the Easter Bank Holiday weekendin order to save energy.

- May 13th to 21st was National Bike Week and was promoted by NOHC Green Energy Committee to staff, with a potential to win prizes from Healthy Ireland by posting pictures of themselves biking on Social Media and tagging TFI on Twitter or Instagram. During this week, May 17th was designated national cycle to work day with heavy promotion for staff participation through internal email campaigns.

- On May 20th, 2022, "NOHC Bee Day" was held to promote awareness of new beehives onsite and the importance of the bee to our environment and production of food.

- On May 30th, NOHC opened "Green Week", with a theme for recycling. During this time, waste segregation was introduced into the canteen for Recyclables, General Waste and Compostables. Office

Desktop Recyclers were introduced and the general waste baskets removed also. To reinforce the idea, three talks were held on the methodologies for segregation.

- Also in May, NOHC partnered with the NTA (National Transport Authority) and:
    - Launched NOHC partnership with the NTA & Employee travel survey - 141 responses received on the survey.
    - Relaunched the Bike to Work scheme, during National Bike Week partnered with Healthy Ireland and the TFI.
- October 2022 brought NOHC Walkathon, which was held in competition with other hospitals and healthcare agencies to encourage people to walk at every opportunity during the month and record their daily distances as a measure for the competition. Participation was high with a number of teams competing from NOHC. Additionally in October, NOHC held a week without the use of disposable cups to encourage people to bring their own reusable cups to work.
- In November NOHC opened a 40-bay bicycle shelter to encourage more sustainable travel to work.

Events have been ongoing in 2023 with water bottles supplied to staff for reuse, bike to work week with talks and advice, appointment of green energy champions and Marchathon to encourage more walking.

The Hospital also launched its Sustainability Programme 2022-2025 which is presented to all new staff at induction and all staff information sessions.

5 ACHIEVING OUR CARBON TARGET

5.1 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)	[kgCO2]	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.

5.2 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 towrads 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 $kgCO_2/kWh$, 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, providing 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 $kgCO_2$ in 2022. The gap to target between 2022 and 2030 is 277,058.5 $kgCO_2$, to reach 2030 emission targets of 359,751.0 $kgCO_2$. The overall carbon reduction target is 51% of the 2016-2018 baseline emissions.

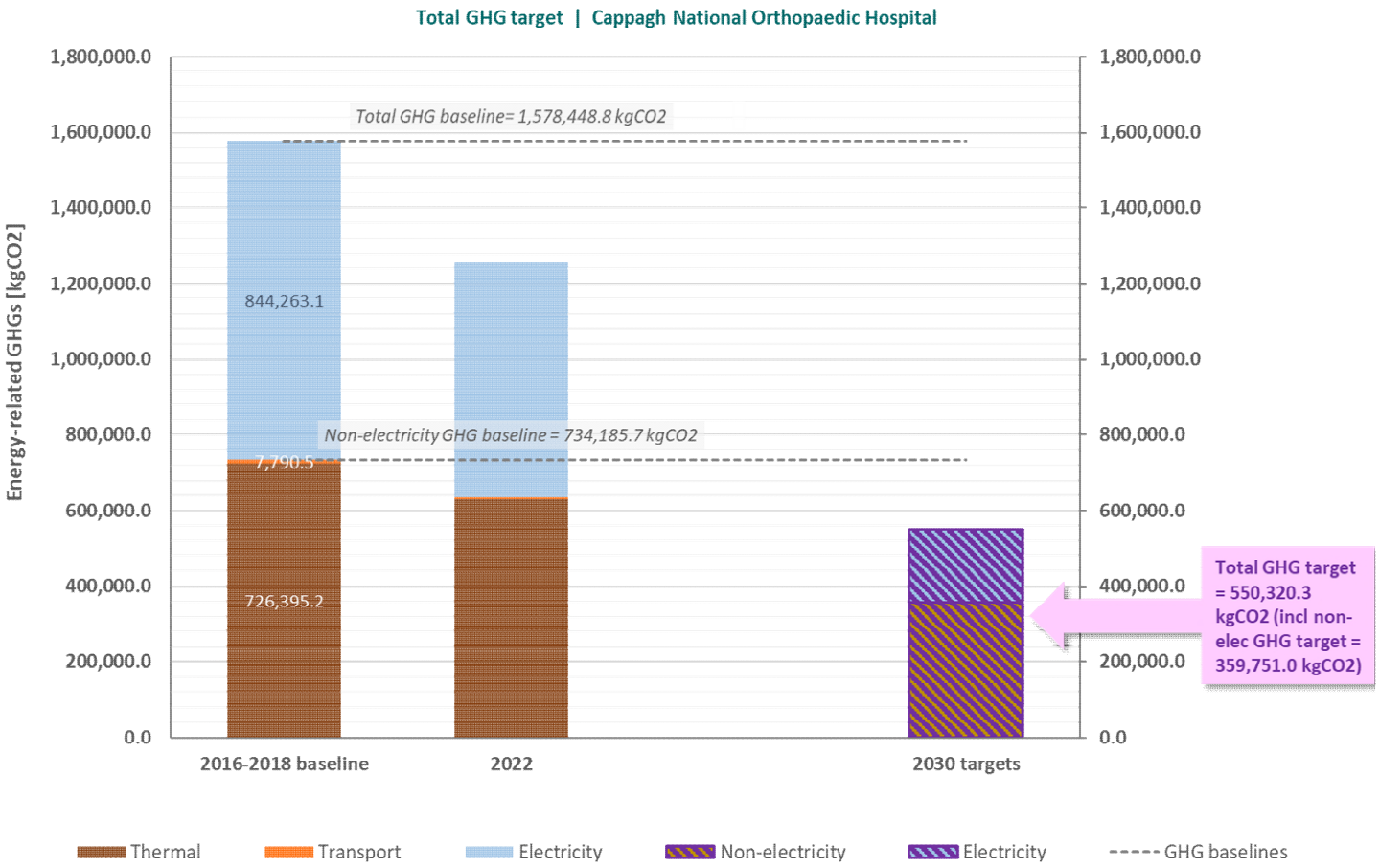


***Fig 1**. GHG Targets showing the Baseline and Targets for each Producer of GHGs onsite*

5.3 Project Pipeline

Additional decarbonisation pathway(s):

Proposed actions to achieve energy carbon target: NOHC has developed a 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 1123.14m^2 to 4469.63m^2, 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 Section 2 of 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 a solar PV farm with a predicted output of 86,401 kWh per annum. This represents 10% of current load requirements and reduces our emissions by 40,586 kgCO2.

Energy usage data for the winters of 2021/2022 and 2022/2023 showed the following decreases in energy consumption in kWh, with a 12% reduction overall:

Total Energy			
Winter periods	**Gas Use**	**Electricity Use**	**Total Use**
2021/2022	2,483,215	994,280	3,477,495
2022/2023	2,090,586	962,706	3,053,292
Difference	- 392,629	- 31,575	- 424,204
% Difference	**-16%**	**-3%**	**-12%**

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.

5.4 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.

6 ACHIEVING OUR ENERGY EFFICIENCY TARGET

6.1 Gap To Target

Energy Efficiency Baseline:

The 2022 Energy Saving was 40.4% 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.

6.2 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 asstaff 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 new energy efficient windows

7 ENERGY AND ENVIRONMENTAL MANAGEMENT SYSTEMS

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.

8 GREENING OUR PROCUREMENT

8.1 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.

8.2 Green Public Procurement Organisational Tracker

Under Circular 20/2019 all Central government departments are required to track and monitor their application of green procurement. There has been no directive as yet for wider public sector reporting, but this is expected to be introduced in 2023. All tenders over the threshold (€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.

9 BASELINING AND REDUCING RESOURCE USE

9.1 Paper Waste Reduction

On 13-Oct-2022, a survey was run on sustainability at NOHC for staff and the results were used to encourage the reduction in the use of print paper and disposable cups for beverages.

Recyclable paper was rolled out to office areas in late 2022.

10 IMPROVING OUR BUILDINGS

10.1 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'.

10.2 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.

10.3 Non-Fossil Fuel Heating in New Builds 2023

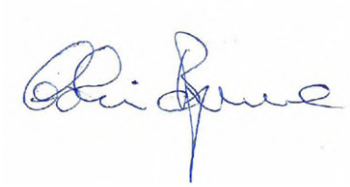
All new builds are designed to support heat pumps as the primary source of heating and hot water. Refurbishments involving upgrades to heating are planned so that they are connected to a system that is zoned, modular and can be linked in with later upgrades to the same building.

11 IMPROVING OUR TRANSPORT

11.1 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.

12 MANAGEMENT/BOARD SIGN OFF



Signed _____

Chairperson of Board of Directors