



CYFARFOD BWRDD PRIFYSGOL IECHYD UNIVERSITY HEALTH BOARD MEETING

DYDDIAD Y CYFARFOD: DATE OF MEETING:	29 September 2022
TEITL YR ADRODDIAD: TITLE OF REPORT:	Decarbonisation Delivery Plan
CYFARWYDDWR ARWEINIOL: LEAD DIRECTOR:	Lee Davies, Director of Strategic Development and Operational Planning
SWYDDOG ADRODD: REPORTING OFFICER:	Paul Williams, Head of Property Performance

Pwrpas yr Adroddiad (dewiswch fel yn addas)

Purpose of the Report (select as appropriate)

Ar Gyfer Penderfyniad/For Decision

ADRODDIAD SCAA SBAR REPORT

Sefyllfa / Situation

The purpose of this report is to provide the Board with an update on the work being progressed to respond to the Welsh Government NHS Wales Decarbonisation Strategic Delivery Plan for NHS Wales to contribute towards a Welsh public sector wide net zero target by 2030.

The Board is asked to approve the Decarbonisation Delivery Plan and take assurance from progress in line with Planning Objective 6G.

Cefndir / Background

The Welsh Government (WG) declared a Climate Emergency in 2019 supported by Members of the Senedd and committed to achieving a Net Zero public sector by 2030. In response, NHS Wales published its NHS Wales Decarbonisation Strategic Delivery Plan in March 2021, setting out its ambition to contribute to a Carbon Neutral Welsh Public sector by 2030. This ambition demonstrates how NHS Wales can play its part in the recovery from COVID-19 and its commitment to the Wellbeing of Future Generations Act 2015, which directs public bodies to consider long-term persistent problems such as poverty, health inequalities, and climate change.

It calls for swift action across all Health Boards over the next five years to ensure the targets are adhered to. This ambition will rely on minimising waste, increasing efficiencies, investment in the decarbonisation of buildings and vehicles, and addressing carbon emissions in the supply chain. It recognises that low carbon must be core to decision making and embedded into everyday processes so that it becomes integral to decisions and calls for Health Boards to lead by example.

Specifically, and at the start of this journey, all Health Boards and Trusts are required to develop a Decarbonisation Delivery Plan. Hywel Dda University Health Board's Decarbonisation Delivery Plan (the Plan) provides a road map for how we will meet the targets through: carbon best practice in our new developments, the use of renewable technology,

switching to low carbon vehicles, reducing how much we travel, the application of IM&T technology enhancements, and changes to the way we procure goods and services.

For NHS Wales, a carbon footprint was established in 2018/19 at approximately 1 million tonnes of CO₂e for the year 2018/19. HDdUHB's carbon footprint is measured at 98,854 tCO₂e, 9.87% of the total NHS Wales footprint. 2018/19 has been set as the baseline from which targets are projected and progress measured, updated annually as part of the WG's annual reporting returns. It is important to note this carbon footprint baseline is subject to change as WG continues to review and revise the reporting scope, and once completed will require current projections to be reviewed.

Hywel Dda University Health Board (HDdUHB) has included Decarbonisation as one of its priorities by committing to a Planning Objective (PO), 6G. The PO states:

“By first quarter 2022/23 develop and seek Board endorsement for a strategic roadmap to respond to the Welsh Government ambition for NHS Wales to contribute towards a public sector wide net zero target by 2030. The Health Board will set out a work programme and implement this plan to meet the targets established in the NHS Wales Decarbonisation Strategic Delivery Plan in the areas of carbon management, buildings, transport, procurement, estate planning and land use, and its approach to healthcare including promoting clinical sustainability. Where feasible through the opportunities presented via the Health Boards transformation journey it will look to exceed targets and establish best practice models and pilots, as exemplars for the NHS and wider public sector. The overall aim will be to reduce the Health Board's carbon footprint by at least 34% by 2030 to support the wider public sector ambition to address the climate emergency.”

In addition, the HDdUHB has established a Decarbonisation Task Force as a working group to support with this agenda.

Asesiad / Assessment

The HDdUHB submitted its Decarbonisation Plan to WG as a draft in March 2022. The early feedback from WG is that the Plan was one of the more robust plans submitted, with reference to inclusion of a strong baseline, early target setting, an initial assessment of funding need, good governance, reference to a behavioural programme, good examples of projects and innovation and a developed action plan.

The Plan sets the strategic direction of travel for HDdUHB over the rest of the decade and the incorporated Decarbonisation Action Plan summarises the deliverable decarbonisation actions from March 2022 up to 2025, as an initial programme. Successful implementation of this Decarbonisation Delivery Plan will require a step-change in decarbonisation activity across HDdUHB that will need to be appropriately resourced, and will require significant additional funding from WG to support with the delivery and achievement of established targets.

The Plan structures decarbonisation of NHS Wales into 6 main activity streams:

- Carbon Management;
- Buildings;
- Transport;
- Procurement;
- Estate Planning and Land Use;
- Approach to Health and Social Care by all partners in the Public Sector Service Board.

Summary of key outputs:

- The Plan sets the strategic direction of travel for HDdUHB up to 2030, with a focus on deliverable actions from March 2022 up to the 2025 interim target. These quantified initiatives are estimated to achieve a 21% reduction versus the baseline carbon footprint.
- The Plan captures all the current initiatives delivered or planned that positively impact on carbon reduction. Examples of projects include Solar Farm and roof mount solar projects, Heat Pump project at Cardigan Integrated Care Centre, roll out of Electric vehicle fleet etc;
- It addresses carbon emissions across all emissions scopes, including those from buildings, transport, waste, water and procurement of goods and services;
- It sets out a summary of the impact, where quantifiable, of the decarbonisation actions that should be implemented by the UHB. An initial £8.7 million is estimated as required to support the HDdUHB with feasibility, design and early win projects. Reflecting this will need to be substantially increased to achieve the longer term targets through an whole organisation approach and large scale projects;
- Funding the Plan will require low carbon alignment in how we utilise existing capital funding for healthcare delivery, procurement, and capital projects, aligned to the HDdUHB capital investment plans, with a particular focus around the delivery of the 'A Healthier Mid & West Wales' Programme, and Major Infrastructure investment plans.
- A result of the action plan focussing on the time period of 2022-25 is that many of the identified opportunities centre around buildings and infrastructure. However, **the largest reductions arise from actions taken within the purchase of goods and services** (62% of carbon footprint), as this is the greatest proportion of the overall carbon footprint.

Overview of actions delivered:

- The Decarbonisation Task Force has formally signed off the Plan;
- An update was provided to the Sustainable Resources Committee on 28th June 2022 to provide assurance to the Committee on performance against the PO;
- The Plan was submitted to WG in draft form at the end of March, including the HDdUHB Action Plan that sets out key actions across a three year initial plan and a delivery programme up to 2030;

The following next steps and mobilisation activities are planned:

- To support and monitor this live working document via the decarbonisation Task Force; and build responsibility for delivery across the organisation – assigning specific projects as required;
- To continue to liaise with WG to develop a way forward that supports the HDdUHB with delivering on the action plans;
- Ensure wider buy-in with a focus on awareness and engagement through a range of carbon awareness initiatives, such as the Green Team's project, supporting clinical innovation work, staff awareness communications etc;
- Continue to work with WG to align our carbon reporting systems with WG to establish an agreed footprint baseline.

Summary

The HDdUHB continues to be represented at the Climate Change & Decarbonisation National Programme Board and Community of Expert Group facilitated by WG. There are clear themes being fed back through these groups reflecting that the NHS is at the start of this journey. Across Wales there is much uncertainty on how the 2030 target will be achieved, particularly in view of the current capital and revenue financial challenges, and the ongoing review by the WG to establish a fixed carbon footprint baseline across the NHS in Wales. Only once WG has established a fixed baseline can organisations provide assurance around meeting the targets.

The HDdUHB has established robust governance to deliver on the WG ambitions in Decarbonisation, which is led by a Decarbonisation Task Force, driven by Executive Leadership and with progress scrutinised by the Sustainable Resources Committee. The Plan provides HDdUHB with a clear strategic intent and road map on how we can meet the interim targets and embed Decarbonisation at the core of our operations and business but, as with the wider public sector, this will be dependent upon significant financial investment support.

The Auditor General in his report ‘Public Sector Readiness for Net Zero Carbon by 2030’ has reflected on the progress being made on decarbonisation in 48 larger public sector bodies. In the report, the Auditor General makes the following five calls for action from public bodies:

- Strengthen your leadership and demonstrate your collective responsibility through effective collaboration;
- Clarify your strategic direction and increase your pace of implementation;
- Get to grips with the finances you need;
- Know your skills gaps and increase your capacity; and
- Improve data quality and monitoring to support your decision-making.

WG colleagues have confirmed their intention to facilitate discussions within WG and NHS Organisations on the matter of programme delivery, reflecting the financial implications of decarbonisation and intention to link in with Chief Executive Officer (CEO) and Directors of Finance meetings.

Argymhelliad / Recommendation

The Board is asked to:

- **APPROVE** the Hywel Dda Decarbonisation Delivery Plan;
- **NOTE** and **TAKE ASSURANCE** from progress on Decarbonisation in line with Planning Objective 6G and WG reporting requirements;
- **NOTE** the ongoing work nationally on carbon reporting and the current uncertainty in funding to meet the 2030 target.

Amcanion: (rhaid cwblhau)
Objectives: (must be completed)

Cyfeirnod Cofrestr Risg Datix a Sgôr
Cyfredol:
Datix Risk Register Reference and
Score:

A new Datix Risk is being established

Safon(au) Gofal ac Iechyd: Health and Care Standard(s):	All Health & Care Standards Apply
Amcanion Strategol y BIP: UHB Strategic Objectives:	All Strategic Objectives are applicable
Amcanion Cynllunio Planning Objectives	6G_22 Decarbonisation and green initiatives plan
Amcanion Llesiant BIP: UHB Well-being Objectives: Hyperlink to HDdUHB Well-being Objectives Annual Report 2018-2019	9. All HDdUHB Well-being Objectives apply

Gwybodaeth Ychwanegol: Further Information:	
Ar sail tystiolaeth: Evidence Base:	Decarbonisation Delivery Plan
Rhestr Termau: Glossary of Terms:	Included within the body of the report.
Partïon / Pwyllgorau â ymgynhorwyd ymlaen llaw y Cyfarfod Bwrdd Iechyd Prifysgol: Parties / Committees consulted prior to University Health Board:	Decarbonisation Task Force Group Sustainable Resources Committee

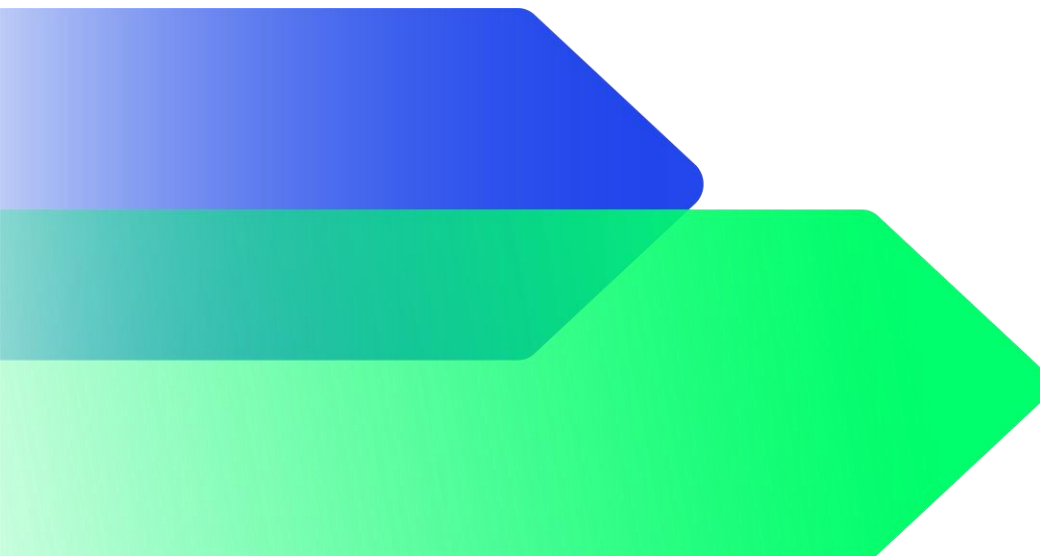
Effaith: (rhaid cwblhau) Impact: (must be completed)	
Ariannol / Gwerth am Arian: Financial / Service:	Implications on revenue and capital
Ansawdd / Gofal Claf: Quality / Patient Care:	Responsibilities around sustainability and the carbon agenda
Gweithlu: Workforce:	All employees can play a role and influence change. Workforce represent at the T&F group.
Risg: Risk:	A Risk Register developed as part of the Decarbonisation Task Force group
Cyfreithiol: Legal:	This will be reviewed and monitored
Enw Da: Reputational:	This has a significant reputational risk, linked to WGs declared climate emergency and achievement of 2030 targets
Gyfrinachedd: Privacy:	Not Applicable
Cydraddoldeb: Equality:	Equality Impact Assessment to be undertaken if required.

HYWEL DDA UNIVERSITY HEALTH BOARD

Decarbonisation Delivery Plan

Final version

August 2022



About the report

In response to requirements set out in the NHS Wales Decarbonisation Strategic Delivery Plan, this initial Decarbonisation Delivery Plan has been developed by the Carbon Trust on behalf of Hywel Dda University Health Board (HDUHB). It sets the strategic direction of travel for the next ten years and the incorporated Decarbonisation Action Plan (section 5) summarises the deliverable decarbonisation actions that will be implemented over the next 2+ years (from March 2022). The Delivery Plan addresses carbon emissions across all greenhouse gas (GHG) emissions scopes, with a specific focus on the emissions associated with construction and estate refurbishment.

Acknowledgements

The Carbon Trust developed this Delivery Plan based on an analysis of data provided by HDUHB, observations made during site visits, and information gathered during targeted engagement with key functions across the Health Board (Estates, Finance, Procurement, Transport, Clinical).

The Carbon Trust would like to thank everyone that has contributed their time and expertise during the preparation and completion of this report.

Who are the Carbon Trust

We are a trusted, expert guide to Net Zero, bringing purpose-led, vital expertise from the climate change frontline. We have been pioneering decarbonisation for more than 20 years for businesses, governments, and organisations around the world.

We draw on the experience of over 300 experts internationally, accelerating progress and providing solutions to this existential crisis. We have supported over 3,000 organisations in 50 countries with their climate action planning, collaborating with 150+ partners in setting science-based targets and supporting cities across 5 continents on the journey to Net Zero.



**The Carbon Trust’s mission is to
accelerate the move to a decarbonised future.**

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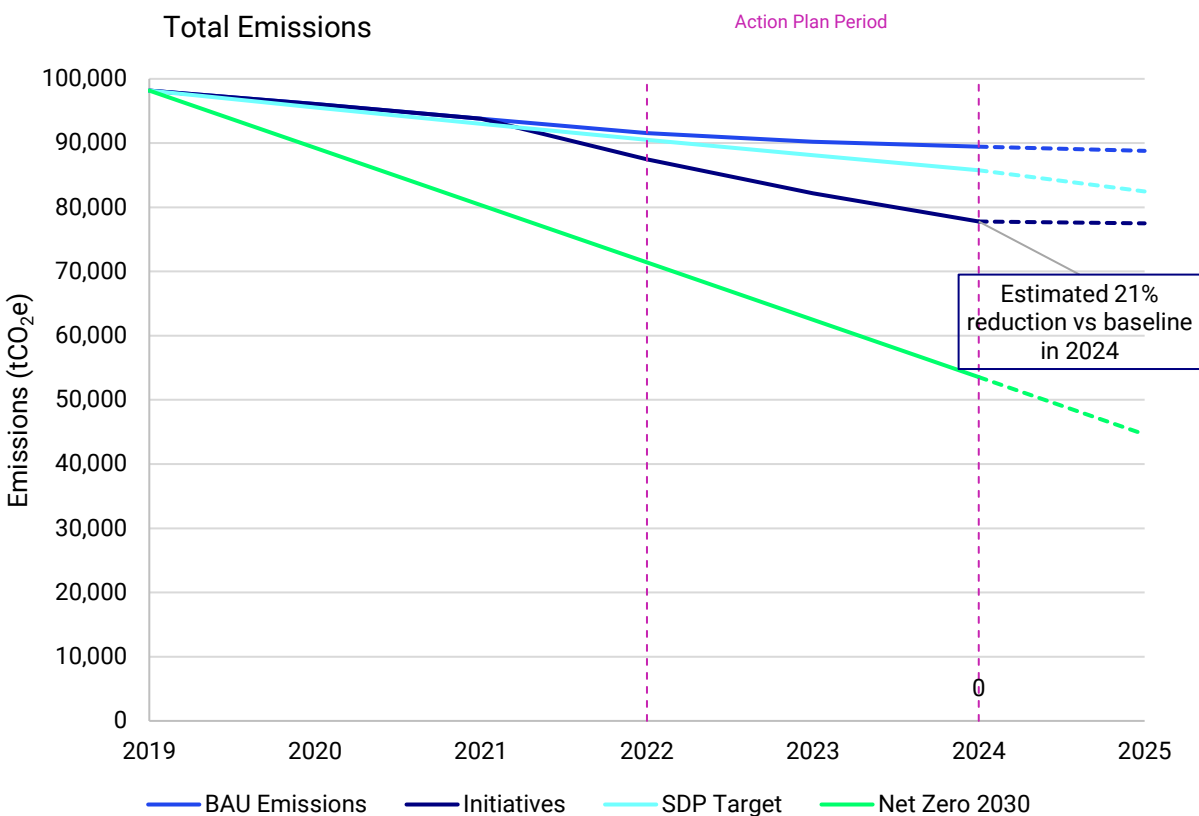
Executive Summary

- This Decarbonisation Delivery Plan (DDP) sets the strategic direction of travel for HDUHB over the next ten years and the incorporated Decarbonisation Action Plan (DAP, section 5) summarises the deliverable decarbonisation actions that will be implemented over the next 2+ years (from March 2022). **Successful implementation of this Decarbonisation Delivery Plan will require a step-change in decarbonisation activity across HDUHB, to be appropriately resourced, and require significant additional funding from Welsh Government to support with the delivery and achievement of established targets**
- **The DDP addresses carbon emissions across all GHG emissions scopes**, including those from buildings and land use, transport, waste, water, procurement of goods and services and wider clinical healthcare delivery. In addition, it provides a specific focus on the emissions associated with construction and refurbishment.
- **The table below sets out a summary of the impact (where quantifiable and estimated) of the decarbonisation actions that will be implemented by HDUHB to March 2025 to align with the NHS Wales Decarbonisation Strategic Delivery Plan (SDP) date and 3 yearly Integrated Medium Term Plan (IMTP).** As shown, it has not been possible to quantify every action in the 2022-25 Decarbonisation Action Plan (DAP). A fuller breakdown of these decarbonisation actions can be found in Section 4; details of how actions have been quantified are in Appendix 2.

Area	Est. Benefits			Indicative baseline Capital Costs 2022-25 (£)	Est. 10-year Carbon Savings (tCO ₂ e)
	£	tCO ₂ e (2021)	Activity (unit)		
Carbon Management	**£218,400	600	2,768,700 kWh	TBC	4,300
Buildings	**£1,509,200	2,500	11,624,900 kWh	£6.5m	18,300
Transport	**£89,700	300	96,000 litres 148,100 kWh _e	£2.1m	2,000
Procurement	TBC	8,500	TBC	£100k	62,600
Estate Planning & Land Use	TBC	TBC	TBC	TBC	TBC
Approach to Healthcare	TBC	TBC	TBC	TBC	TBC
Total	£1,817,400**	11,800	TBC	£8.7m	87,200

- ** The indicative costs in the above table will be subject to further refinement at the time of the project to reflect the inflationary impact and the outcome of feasibility studies to offer detailed design costs.

- **** Major infrastructure business cases outline costs in the order of £87m are required to enable some of the decarbonisation actions** - including electrical infrastructure upgrades and improvements to building fabric.
- It is recognised that it will not be practical or possible for HDUHB to stop all carbon emissions entirely from its operations. This will be the same for all Health Boards and Trusts across Wales. **HDUHB will strive to reduce its emissions as far as possible before using offsetting measures as the final step to align with Welsh Government's Net Zero public sector by 2030 ambition.**
- This calculation is called the "Gap to Net Zero Alignment", which is the gap that will require offsetting measures. **A gap to net zero alignment has been estimated in 2025 as 33,873 tCO₂e. This represents HDUHB's estimated residual carbon emissions in 2025, plus the initiatives that were unquantifiable at this point in terms of carbon savings.** HDUHB will need to offset the remaining carbon emissions using the correct and approved methods. The graph below gives a visual representation of these savings as HDUHB's 'Decarbonisation Pathway' towards 2025. A business-as-usual (BAU), Net Zero 2030 pathway, and the NHS Wales Strategic Delivery Plan target have also been included for context. An Action Plan period of 2022-24 is shown in alignment with NHS Wales Decarbonisation Strategic Delivery Plan requirements, however, it is anticipated that, due to funding limitations, delivery will likely stretch beyond 2024.



- The Health Board has already delivered several projects that align with the DAP and SDP already such as LED lighting, solar power and ground source heat pumps.
- The Health Board has already started the journey of embracing new ways of sustainable working such as flexible and hybrid working (remote working) where practical and this is underpinned by significant advances in supporting IT infrastructure as well as education and behaviour change

- The Health Board is undertaking a strategic review of all service requirements and estates to deliver services. This continues work in progress and undertaking some Decarbonisation work based on existing services and Estates may well be rendered outdated through the implementation of HDUHB 'Healthier Mid and West Wales'.
- The Health Board is developing several areas which support decarbonisation, such as the One Health approach to healthcare, a new Food Strategy and a Population Health based service design.
- The Health Board is exploring the feasibility of concepts that may help in the journey to sustainability such as aquaponics, integrated health and social care as well as decarbonisation business such as on-site, adjacent site and remote site power generation including carbon trading and offsetting.
- The Health Board are demonstrably evidencing commitment to Decarbonisation through recruitment of a resources to support this agenda
- The Health Board will ensure any infrastructure works as part of the major infrastructure business case will be aligned to this Decarbonisation programme. All ambitions will be subject to the availability of funding and resources to support the delivery of the programme. It is expected that the major capital scheme requirements will be developed during this period to support the 2030 targets.
- It should be noted that under a business-as-usual case, both grid decarbonisation and decarbonisation of the supply chain are taken into account. As a result of these factors, **the total footprint is expected to decrease by 21% between 2019 and 2025 under the business-as-usual case.** However in the interim carbon footprint may fluctuate and even increase whilst HDUHB evolves to its new operating model, for example, new additional operating theatres at Prince Phillip will increase the carbon footprint.
- The 'initiatives' case takes into account both the reductions of the business-as-usual case as well as the potential carbon savings resulting from the actions developed within this plan. This DAP focuses on the near future (2022-25), meaning the actions identified are likely to be low-hanging fruit that can be quickly implemented. A result of this is that the carbon savings from initiatives level off after 2025, leaving a significant gap to target; this will be addressed in future DAPs with the development of more initiatives in future years. Furthermore, many of the actions outlined within this report suggest the implementation of feasibility studies, therefore, **the largest reductions in emissions are likely to be seen post-2025.**
- A result of the delivery plan focussing on the period of 2022-25 is that many of the identified opportunities centre around buildings. However, **the largest reductions arise from actions taken within the purchase of goods and services** – as this is the greatest proportion of the overall carbon footprint.
- It should be noted too that **the vast majority of actions identified within this plan cannot be quantified but are likely to either support the reduction of emissions or contribute to emission reductions in the future.** These measures are not reflected in the graphs and tables above but will underpin a lot of the work that will need to be carried out by HDUHB to meet its 2030 target.
- Although these initiatives, if implemented, are likely to result in strong carbon reductions, especially when measured against the SDP target, there is still a long way to go in achieving net

zero emissions by 2030. **Future DAPs will need to increase the level of ambition and look to reduce emissions even further and faster.**

- **A 'Decarbonisation Programme Manager' and a One Health Project Manager will be put in place to drive the implementation of the supporting Decarbonisation Action Plan.** The Decarbonisation Programme Manager will engage across HDUHB; spanning estates and facilities, planning, transport, procurement, clinical, and wider stakeholder groups, to ensure that the actions within this Decarbonisation Delivery Plan are taken forward and implemented within the stated timeframe.
- Funding this Decarbonisation Delivery Plan will require low carbon alignment in how we utilise existing funding for healthcare delivery, procurement, and capital projects. Based on specific additional decarbonisation actions and measures shown, the additional funding required is estimated as £8.7m (subject to costs at the time and development of individual projects)
- Implementing the Decarbonisation Action Plan will require additional internal resources and capacity, as well as expert contracted support.

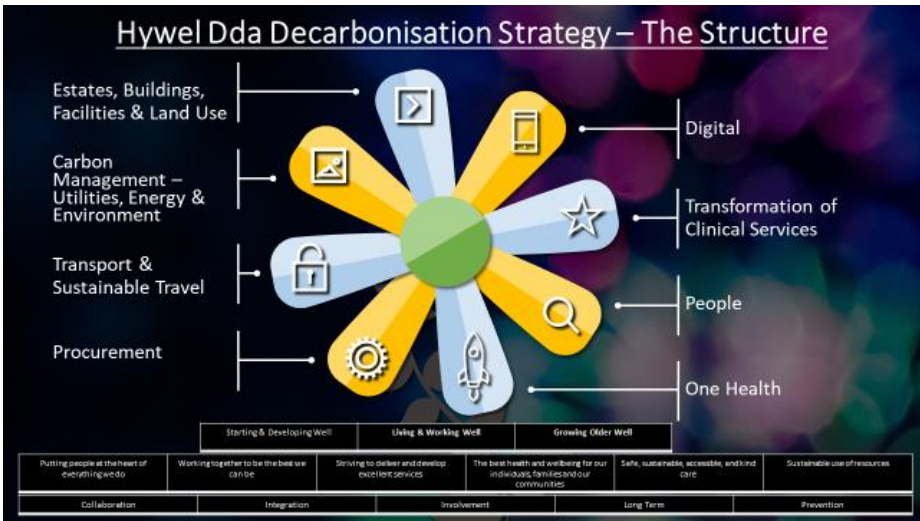
Notes:

- Major infrastructure business case - £87m to align with and enable - including electrical infrastructure upgrades, building fabric etc. As examples;
 - a. High/Low voltage electrical infrastructure project at Prince Phillip Hospital
 - b. Largescale roof replacements at Glangwili and Withybush Hospitals
 - c. Engineering end of life replacement schemes i.e. heating infrastructure, ventilation plant, electrical systems, control systems, boiler house upgrades etc.
 - d. Enabling Electrical infrastructure works at all sites from WPD and SP
 - e. Several existing estates have physical constraints and backlogs preventing ideal decarbonisation investment e.g. boilers. There remains a significant maintenance requirement to restore Estates to a compliant and optimum condition and this places demands on capital availability.
- Where possible when delivering major infrastructure schemes the opportunities to deliver decarbonisation works as part of the wider scheme will be considered where feasible. Of note, Glangwili Hospital and Withybush Hospital are subject to repurposing plans and only prioritised investment on these sites will be targeted in future years. This approach may apply to decarbonisation projects given the link to the timescales for site repurposing plans.
- Whilst there will be considerations about site repurposing plans the wider Mid and West Wales programme represents an opportunity to deliver best practice decarbonisation solutions on new developments and our approach to Healthcare Delivery.
- As part of the Estate modernisation programme there will be new opportunities to decarbonise existing emerging and new properties (as examples Crosshands & Aberystwyth ICCs, Carmarthen Hub) and each will provide distinct and different opportunities requiring bespoke feasibility and design.

Hywel Dda Approach to Decarbonisation

- Hywel Dda have established a robust Governance and Delivery mechanism to deliver ambitions in Decarbonisation and this is led by a Decarbonisation Task Force, driven by the Executive Leadership and progress is scrutinised by the Sustainable Resources Committee.
- A Development and Implementation Group alongside a Monitoring and Reporting group are led by Executive Directors and each focus on achieving our ambitions.
- As the scale of the ambition is vast and differing services have different lenses through which to tackle our Decarbonisation agenda Hywel Dda have structured the Development and Implementation Group by functions to enable the focus to tackle Decarbonisation.
- Each function Leadership develops its specific plans to tackle the challenges of Decarbonisation they face and the separate functional plans combine to make Hywel Dda University Health Board's overall plan and delivery.
- The Health Board have developed a suite of communications to drive Decarbonisation and Sustainability:
 - a. A Strategy
 - b. A Statement of Intent
 - c. A Delivery Plan
 - d. A Route Map and
 - e. An Action Plan
- The Health Board are working with Welsh Government on a robust methodology to benchmark, monitor, measure and report on Decarbonisation on a pan-Wales basis. This is an important facet and will require an unequivocal evidence-based methodology that takes into account inevitable changes to HDUHB such as estates and services so comparisons are equitable and resilient
- The Health Board have developed plans on Carbon Awareness and these are being taken forward by NHS Wales and this will have a positive impact on behaviour change
- The Health Board has set one of its strategic planning objectives to focus on Decarbonisation

Hywel Dda University Health Board organisational structural approach to Decarbonisation



1. Context

1.1. Welsh Government and NHS Wales ambitions for public sector decarbonisation

- The Welsh Government declared a Climate Emergency in 2019 supported by Members of the Senedd and committed to achieving a Net Zero public sector by 2030.
- The NHS Wales Decarbonisation Strategic Delivery Plan was published in March 2021 and demonstrates how NHS Wales can play its part in the recovery from Covid 19 and its commitment to the Wellbeing of Future Generations Act 2015 which directs public bodies to consider long-term persistent problems such as poverty, health inequalities, and climate change.
- The Delivery Plan responds to the Climate Emergency declaration and recognises that the NHS has a critical role to play in contributing toward this target, as the largest public sector organisation in Wales.
- It calls for swift action across all Health Boards over the next five years to ensure the targets are adhered to. This will rely on minimising waste, increasing efficiencies, investing heavily in the decarbonisation of buildings and vehicles, and addressing carbon emissions in the supply chain. It recognises that low carbon must be core to decision making, and embedded into everyday processes so that it becomes integral to the decisions that we make and calls for Health Boards to lead by example.
- Specifically, all Health Boards and Trusts are required to develop Decarbonisation ‘Action Plans’. These are to be regularly updated and committed to within Integrated Medium-Term Plans.
- The wider Welsh Government policy context is supported by legislation, strategy, and ministerial ambitions:

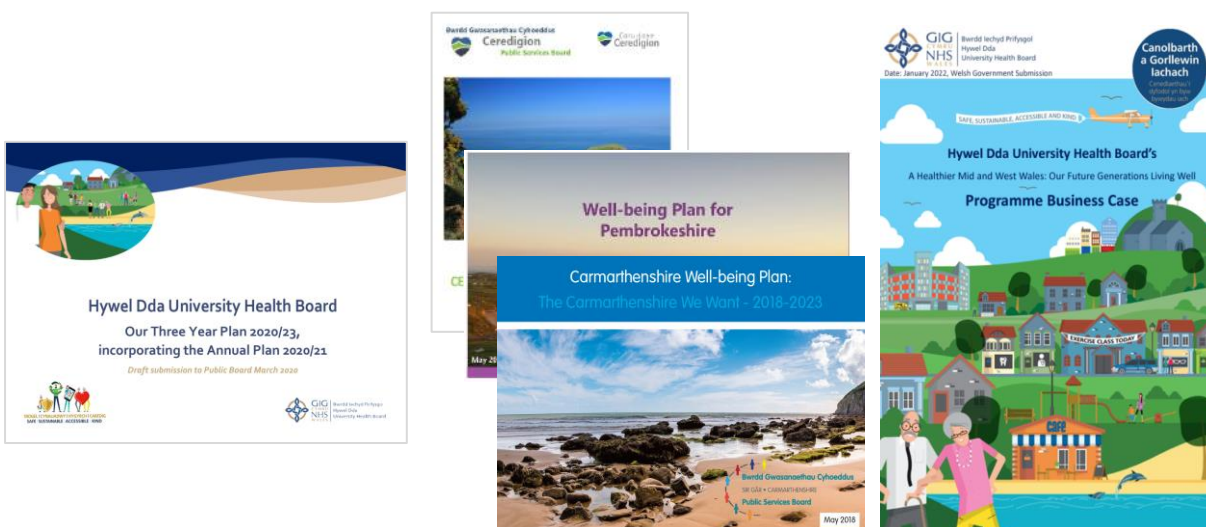


Figure 1 Summary of Welsh Government decarbonisation policy context

1.2. Hywel Dda University Health Board

- Hywel Dda University Health Board (HDUHB) provides healthcare services to a total population of around 384,000 throughout Carmarthenshire, Ceredigion and Pembrokeshire. It provides Acute, Primary, Community, Mental Health and Learning Disabilities services via General and Community Hospitals (including 4 main acute hospitals site) as well as Health Centres, GPs, Dentists, Pharmacists and Optometrists and other sites.
- The Health Board are working in partnership with The Carbon Trust on the Decarbonisation Strategy, Decarbonisation Delivery Plan and Action Plan.
- The Decarbonisation Strategy sets the journey for the next 10 years while the Delivery Plan sets the strategic direction of travel for the next five years and the Action Plan identifies deliverable actions from March 2022.
- The Delivery Plan addresses carbon emissions across all GHG emissions scopes, including those from buildings, transport, waste, water and procurement of goods and services. In addition, it provides a specific focus on the emissions associated with construction and refurbishment.
- Targeted engagement with key functions across the Health Board (Finance, Procurement, Transport, Clinical etc.) were a critical aspect of this work, to ensure buy-in, build momentum and help to embed decarbonisation into decision making and Business As Usual.
- The Health Board have a current strategy – A Healthier Mid and West Wales, which this Delivery Plan will support
- The HDUHB Decarbonisation strategy, delivery plan and action plan fits within the HDUHB corporate planning and its obligations to provide annual and three yearly planning to Welsh Government.

This HDUHB Decarbonisation Delivery Plan will align with the following policies and strategies within the Health Board as examples:



Hywel Dda University Health Board
Our Three Year Plan 2020/23 /
Integrated Medium Term Plan

Public Service Board Well-being
Plans

Jan 22 – Programme Business
Case, A Healthier Mid & West
Wales

2. HDUHB Carbon Footprint

2.1. Carbon footprint scope

HDUHB's carbon footprint is calculated annually in accordance with the Greenhouse Gas (GHG) Protocol – the most widely used and accepted methodology for GHG accounting. The GHG Protocol categorises emissions into three scopes:

- a) **Scope 1:** All direct GHG emissions (i.e., 'on-site' emissions, such as from a gas boiler or tailpipe emissions from a vehicle).
- b) **Scope 2:** Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- c) **Scope 3:** All other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, outsourced activities, waste disposal, etc.

Where direct and indirect emissions are defined according to operational control, such that:

- Direct GHG emissions are emissions from sources that are operationally controlled by the Health Board.
- Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources controlled by another entity (for example, a power plant that generates the electricity consumed by HDUHB, or a waste water treatment site that processes HDUHB's waste water).

2.2. Carbon footprint analysis

Within the NHS Wales decarbonisation strategic delivery plan, a carbon footprint was calculated that covered all emissions sources across all Health Boards. The initial study found that the carbon footprint for NHS Wales to be approximately 1 million tonnes of CO₂e for the year 2018/19. This year has been set as the baseline from which targets are projected and progress measured.

For Hywel Dda University Health Board the total emissions measured **98,854 tCO₂e**, this is 9.87% of the total NHS Wales footprint and positions HDUHB as the Health Board with the second largest proportion of total emissions. This is largely due to several ageing estates serving the rural population of mid and west Wales with associated demands on service and public transport supporting an ageing and increasing population.

It is important to note that work on defining the HDUHB carbon footprint and baseline is ongoing and whilst the indicative carbon footprint in this report is accepted to enable detailed planning and progress the revised footprint, baseline and reporting methodology is yet to be finalised by HDUHB and agreed by Welsh Government. This remains a critical area of work.

The above point on finalisation will include a detailed scope to avoid future confusion and standardise reporting across Wales.

2.2.1. HDUHB Footprint Summary

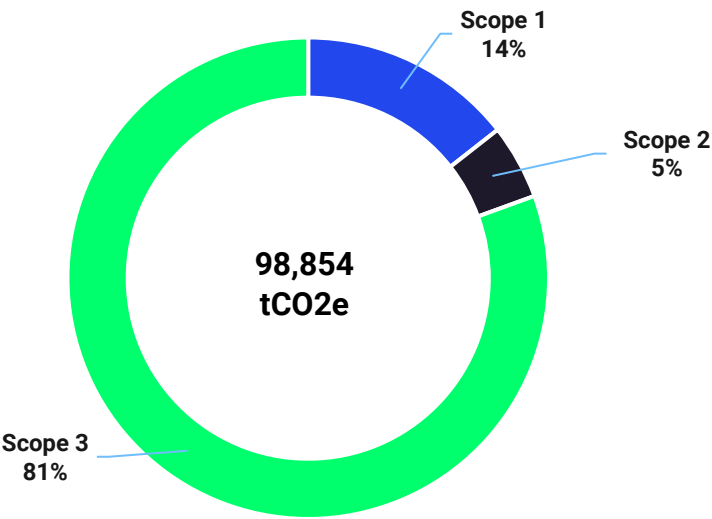


Figure 2: Breakdown of HDUHB’s footprint by scope

The overwhelming majority of emissions arise from the indirect, upstream value chain sources – scope 3. This matches the NHS Wales footprint, where 81% (79,627 tCO₂e) of emissions also arise from scope 3 sources. 14% (14,255 tCO₂e) of emissions are scope 1, from the direct creation or release of greenhouse gases, this is the same proportion as for the entirety of NHS Wales. 5% (4,972 tCO₂e) of emissions arise from scope 2 sources, namely those associated with the consumption of electricity, which again is consistent with the Scope 2 emissions for NHS Wales.

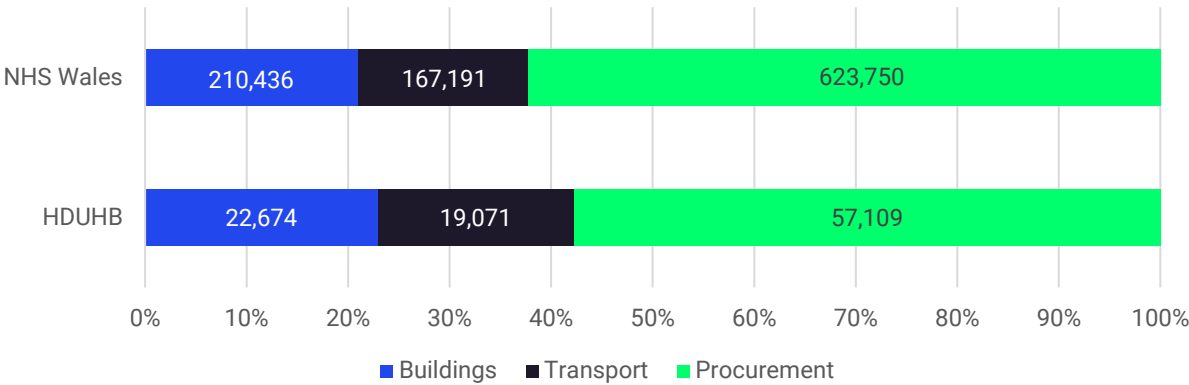


Figure 3: Breakdown of HDUHB’s and NHS Wales’s footprint by sector

The footprint can be broken down by sector, which highlights the emissions sources in a more relatable manner and in a way that aligns with the decarbonisation activity streams of the *NHS Wales Decarbonisation Strategic Delivery Plan*. This shows that for HDUHB the greatest emitting sectors are procurement (58%), building use (23%), and transport (19%); this compares to NHS Wales as a whole with 62%, 21% and 17% for the same sectors, respectively. Data shown on the graph for each sector are in tCO₂e. The following sections examine each sector in more detail.

2.1.1 Building Use

HUHB has a significant number of buildings across the Health Board’s catchment, ranging from small community healthcare sites to the 4 acute hospitals. It is important that emissions are reduced across the whole estate portfolio if the decarbonisation ambitions are to be met. However, with 86% of the total building emissions arising from the four acute sites it is crucial that decarbonisation actions have a focus at these larger sites.

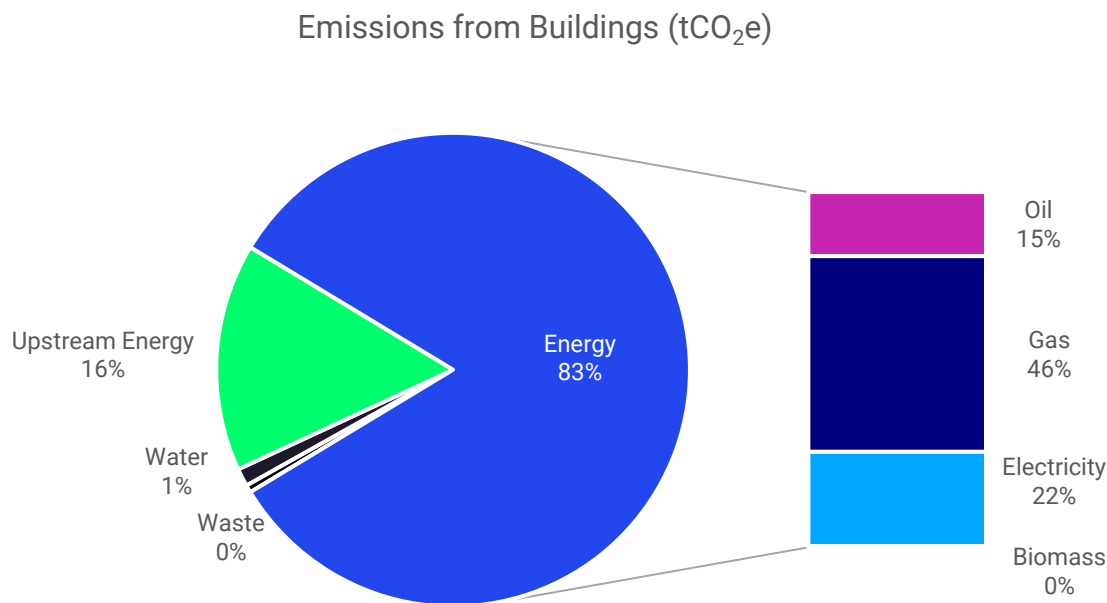


Figure 4: Breakdown of HDUHB’s emissions from energy and utility use in buildings

The vast majority of emissions from activities associated with building use arise from the actual energy consumed (83%). The energy consumed can be broken down into oil, natural gas, electricity, and biomass consumption. Of these fuels natural gas consumption produces the most carbon emissions, this will be predominantly for space heating and hot water services. Emissions from the consumption of electricity, although currently high, will likely decrease year on year as a result of UK grid decarbonisation (depending on the update in electrification of heating). Upstream energy counts towards a significant proportion of building-related emissions, this emissions source considers the emissions associated with the extraction, refining, transport and distribution of fossil fuels used by HDUHB and by power stations generating electricity; transmission losses associated with electricity consumption are also taken into account. Emissions associated with the supply of water, treatment of wastewater, and waste treatment account for less than 2% of building-related emissions.

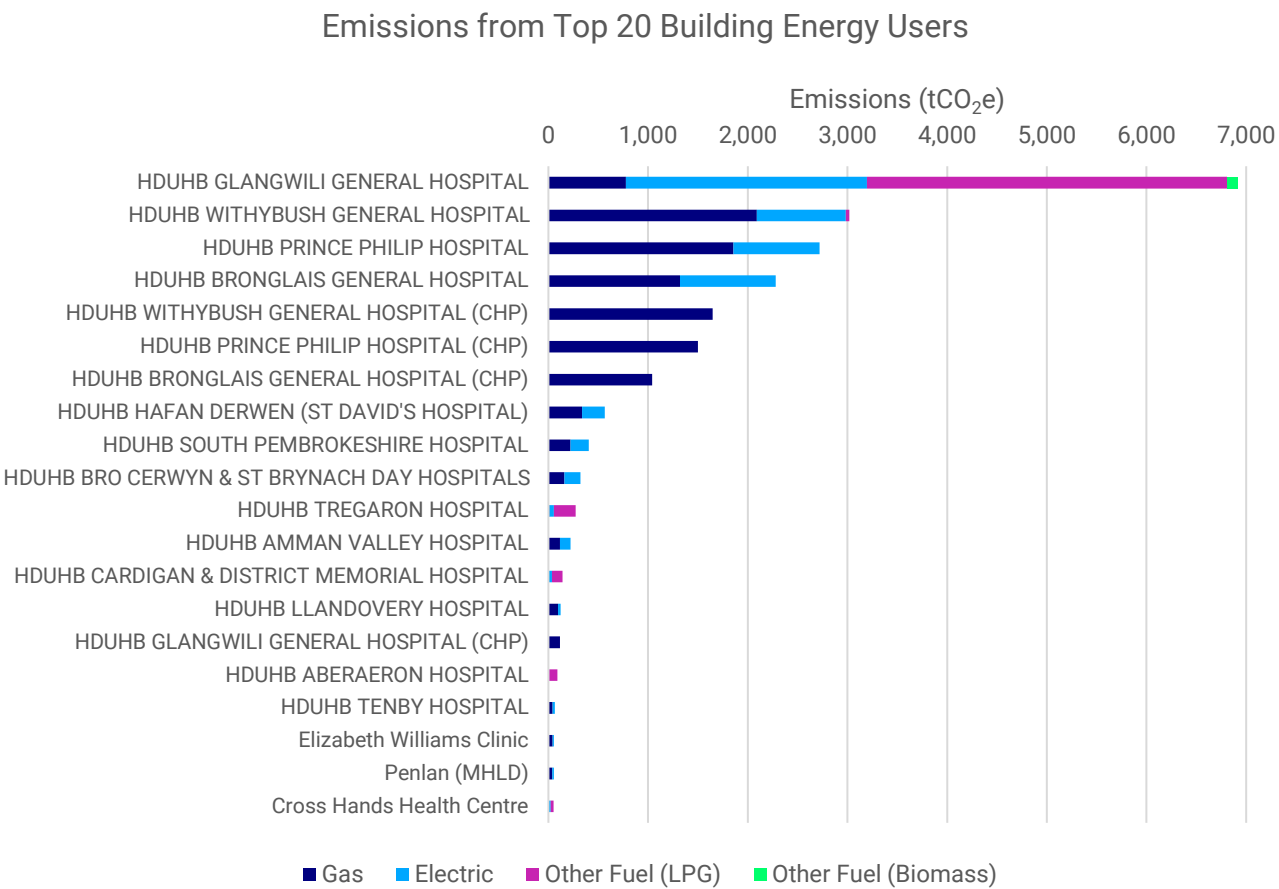


Figure 5: Breakdown of Top 20 building energy users by fuel source

Buildings across the HDUHB estate are responsible for 23% of total emissions (Figure 2), however, this energy use is mainly concentrated within the four acute hospitals. The four acute hospital sites account for 86% of the total energy use from buildings across the whole HDUHB estate. Figure 5, above, demonstrates the relative emissions of the top 20 energy users from the Health Board’s property portfolio. The consumption of gas, electricity, LPG and gas for CHP from the four acute hospital sites far outweigh the energy consumption from the greater number of smaller community healthcare sites. This stresses the importance of carbon reduction opportunities at the acute sites and the importance of moving these properties away from fossil fuel heating. Due to the importance of the acute sites on the overall carbon footprint, these sites were also chosen to be the location for on-site energy audits conducted by Carbon Trust engineers as part of this DAP.

To meet the ambitious carbon reduction goals of HDUHB, and NHS Wales, effective carbon reduction measures will be needed across all buildings. However, actions at the four acute hospital sites of the HDUHB estate will be critical to the success of the Health Board’s decarbonisation ambitions. Given the size of the acute hospital sites and the amount of funding required it is important that a multi-year strategy out to 2030 is adopted by HDUHB. This DAP will set the foundations for HDUHB to take ownership of the carbon management required and continue the work being done to reduce the emissions from buildings across the Health Board.

2.1.2 Transport

Transport related emissions form the smallest sectoral proportion of HDUHB’s footprint. However, given the dependence of fossil fuels for powering vehicles, transport related emissions are unlikely to decrease over time unless action is taken.

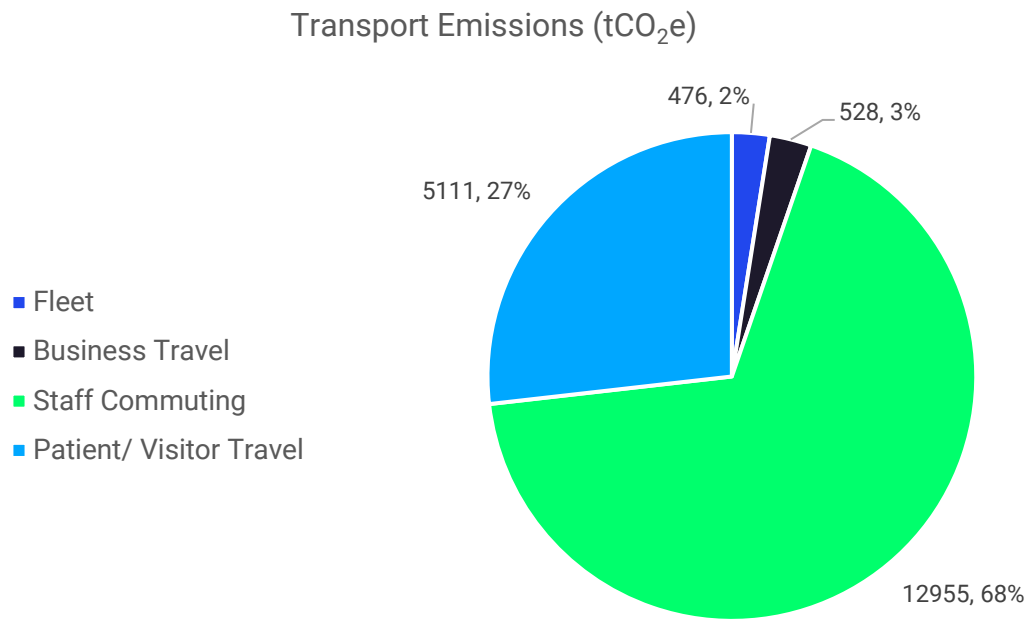


Figure 6: Breakdown of HDUHB’s emissions from transportation related sources

The vast majority of transport related emissions are from indirect sources, predominantly staff commuting and patient/visitor travel – together accounting for 95% of transport emissions. Although difficult to decarbonise due to lack of control of direct control of these emissions, HDUHB can nonetheless influence and encourage staff, patients, and visitors to travel more sustainably. Additionally, travel surveys can be implemented to increase the resolution of the data helping to target specific areas. Emissions from HDUHB’s owned fleet and business travel contribute the remaining 5% to the transport footprint.

2.1.3 Procurement

Emissions associated with purchased goods and services will typically always form the largest part of any organisation’s carbon footprint. In the case of HDUHB, procured goods and services account for **58%** of the total footprint. The emissions covered within purchased goods and services relate to all upstream activities, including the production, transport and distribution and use phase of a product or service. The emissions are calculated by analysing the spend through the procurement department at HDUHB, the expenditure on each good or service is classed by a particular sub-sector for which the carbon intensity is known. Total emissions from procurement related spend equal **57,109 tCO₂e**.

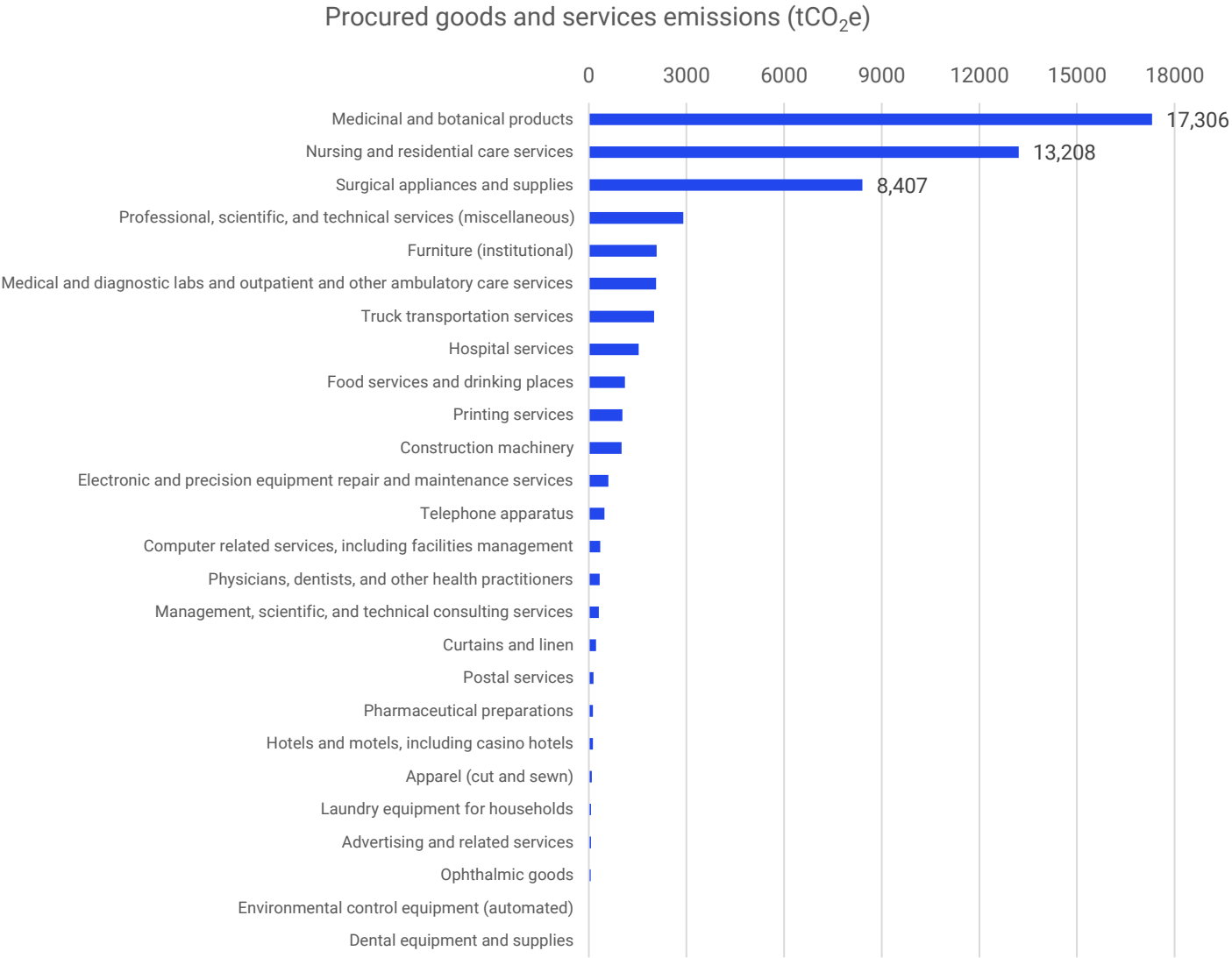


Figure 7: Breakdown of HDUHB’s emissions from procurement by sub-sector

Three categories account for 68% of all procurement related emissions, these are:

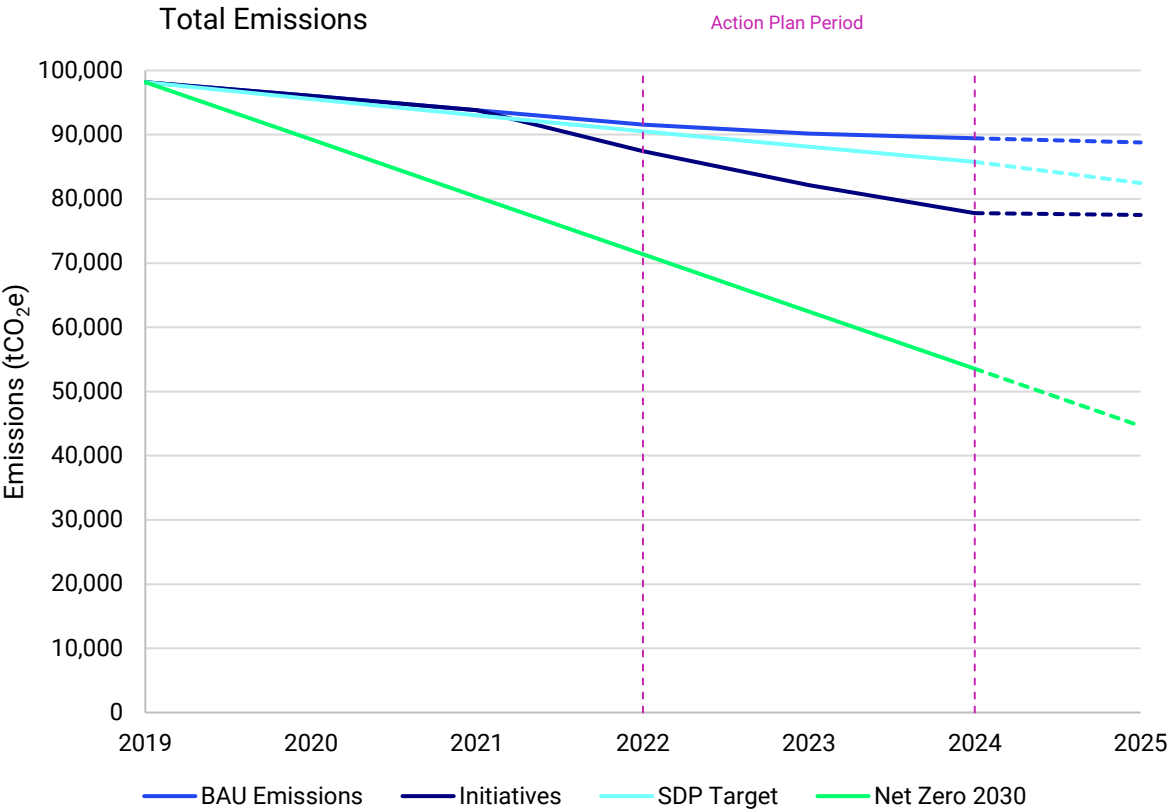
- Medical and botanical products (30%)
- Nursing and residential care services (23%)
- Surgical appliances and supplies (15%)

The remaining categories make up the remainder 32% of emissions from procured goods and services in various proportions. The emissions associated with procured goods and services can be challenging to reduce as they lie outside of the direct control of HDUHB, however, they also represent the largest opportunity for emission reductions due to their high weighting within the overall carbon footprint.

3. HDUHB Decarbonisation Pathway

It is recognised that it will not be practical or possible for HDUHB to stop all carbon emissions entirely from its operations. This will be the same for all Health Boards and Trusts across Wales. HDUHB will strive to reduce its emissions as far as possible before using offsetting measures as the final step to align with Welsh Government’s Net Zero public sector by 2030 ambition.

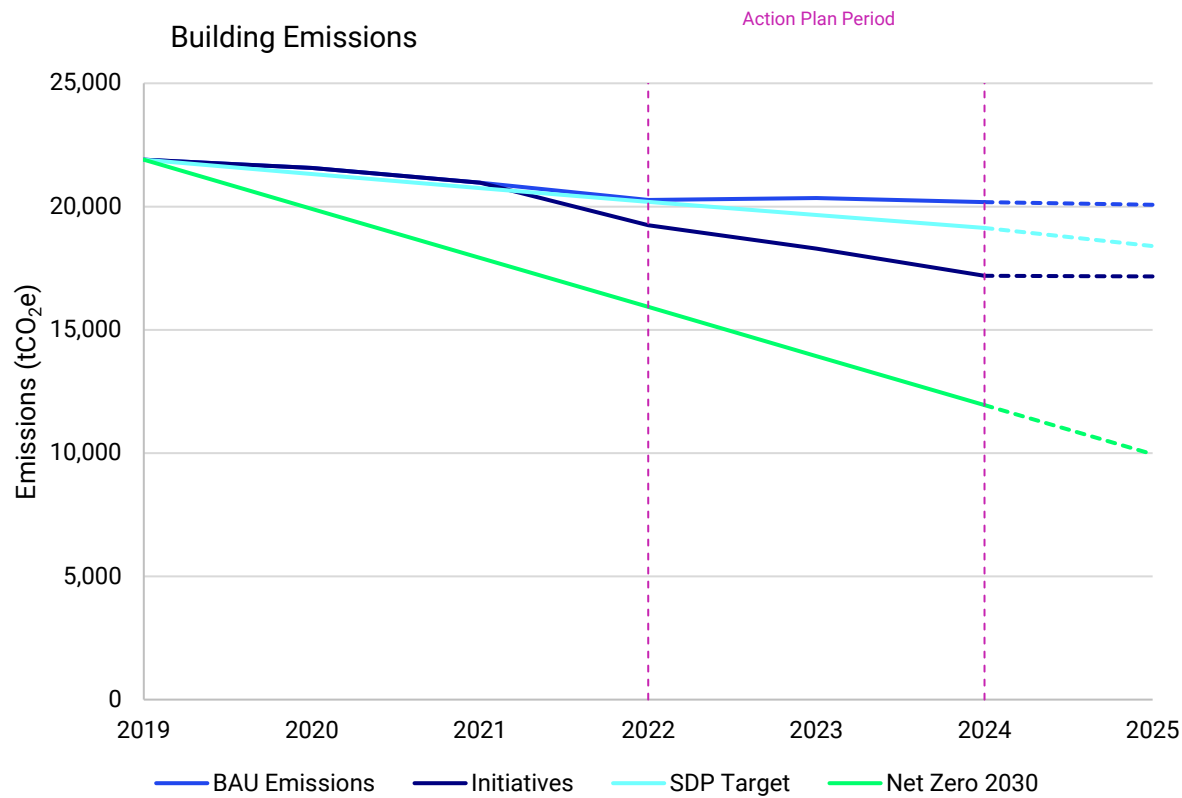
This calculation is called the “Gap to Net Zero Alignment”, which is the gap that will require offsetting measures. A gap to net zero alignment has been estimated in 2025 as 32,873 tCO₂e. This represents HDUHB’s estimated residual carbon emissions in 2025, plus the initiatives that were unquantifiable at this point in terms of indicative carbon savings. HDUHB will offset the remaining carbon emissions using the correct and approved methods. The graph below gives a visual representation of these savings as HDUHB’s ‘Decarbonisation Pathway’ towards 2025. A business-as-usual (BAU), Net Zero 2030 pathway and the NHS Wales Strategic Delivery Plan target have also been included for context. An Action Plan period of 2022-24 is shown in alignment with NHS Wales Decarbonisation Strategic Delivery Plan requirements, however, it is anticipated that, due to funding limitations, delivery will likely stretch beyond 2024.



Year	Emissions (tCO ₂ e)	% Reduction from 18/19	Cumulative savings from initiatives (tCO ₂ e)*
2019	98,173	-	-
2024	77,783	-21%	24,093
2025	77,496	-21%	35,524

*Excludes impact of BAU

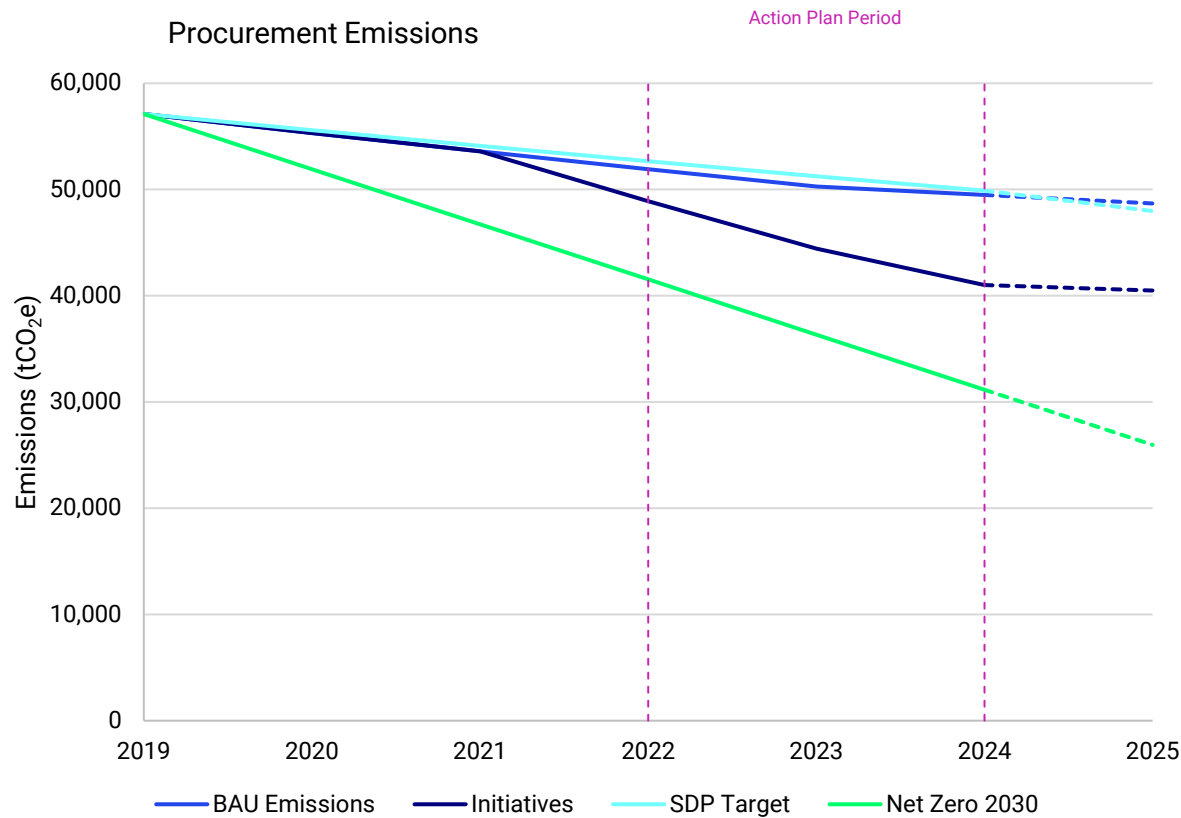
3.1. Buildings



Year	Emissions (tCO ₂ e)	% Reduction from 18/19	Cumulative savings from initiatives (tCO ₂ e)*
2019	21,901	-	-
2024	17,191	-22%	5,081
2025	17,165	-22%	7,508

*Excludes impact of BAU

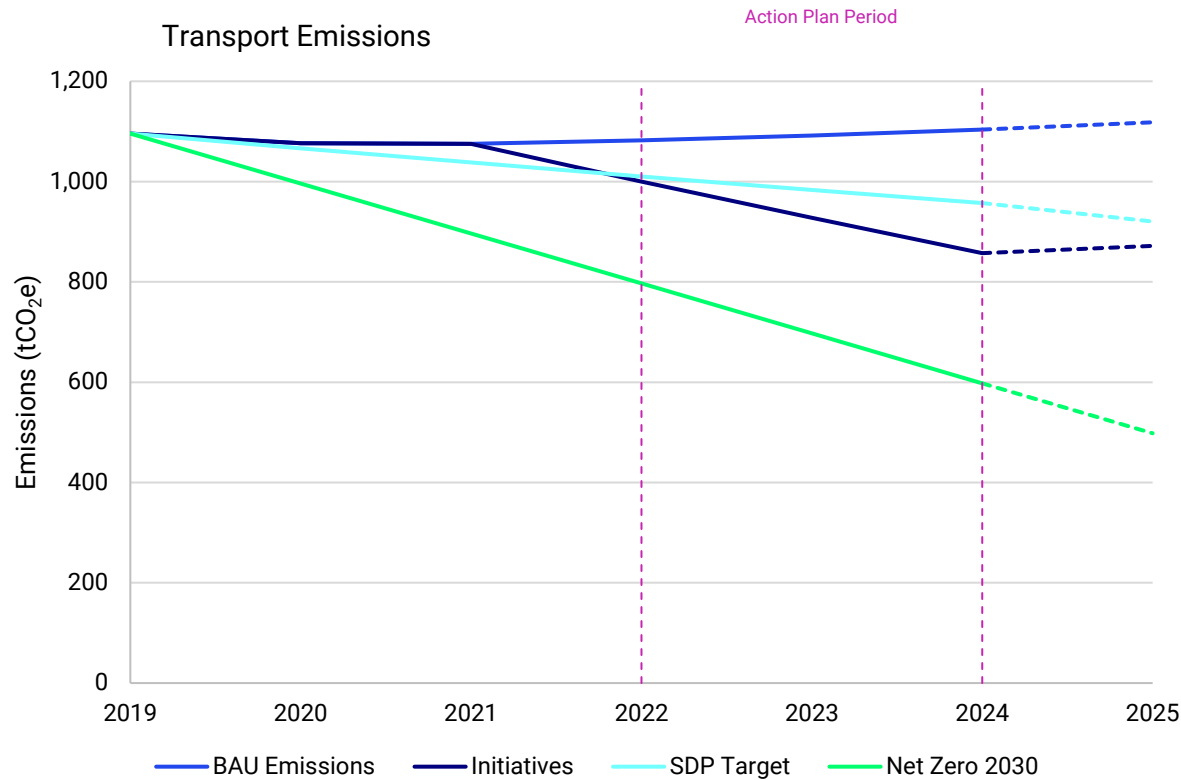
3.2. Procurement



Year	Emissions (tCO ₂ e)	% Reduction from 18/19	Cumulative savings from initiatives (tCO ₂ e)*
2019	57,109	-	-
2024	41,008	28%	17,354
2025	40,498	29%	25,550

*Excludes impact of BAU

3.3. Transport



Year	Emissions (tCO ₂ e)	% Reduction from 18/19	Cumulative savings from initiatives (tCO ₂ e)*
2019	1,096	-	-
2024	857	22%	493
2025	872	20%	739

*Excludes impact of BAU

The above charts and tables display the decarbonisation pathways under a business-as-usual case, with the indicative savings estimated from the initiatives suggested within this Delivery plan, as well as the target lines based on the NHS Wales Strategic Delivery Plan and Net Zero 2030.

It should be noted that under a business-as-usual case, both grid decarbonisation and a decarbonisation of the supply chain are taken into account. The UK has set targets to achieve a zero carbon electricity grid by 2035, this means replacing gas and coal power stations with nuclear and renewables. As such the carbon emissions associated with the consumption of electricity is projected to decrease over time. Similarly, the carbon intensity of the supply chain is expected to decrease over time due to grid decarbonisation and efforts made by companies to reduce carbon emissions. As a result of these factors, the total footprint is expected to decrease by 13% between 2019 and 2025 under the business-as-usual case.

The 'initiatives' case takes into account both the reductions of the business-as-usual case as well as the potential carbon savings resulting from the actions developed within this plan. This Delivery plan focusses on the near future (2022-24), meaning the actions identified are likely to be low hanging fruit that can be quickly implemented. A result of this is that the carbon savings from initiatives levels off after 2024,

leaving a significant gap to target; this will be addressed in future delivery and action plans with the development of more initiatives in future years. Furthermore, many of the actions outlined within this report suggest the implementation of feasibility studies, therefore, the largest reductions in emissions are likely to be seen post 2025.

A result of the delivery and action plan focussing on the time period up to 2025 is that many of the identified opportunities centre around buildings. However, the largest reductions arise from actions taken within the purchase of goods and services – as this is greatest proportion of the overall carbon footprint.

It should be noted too that the vast majority of actions identified within this plan cannot be quantified but are likely to either support the reduction of emissions or contribute to emission reductions in the future. These measures are not reflected in the graphs and tables above but will underpin a lot of the work that will need to be carried out by HDUHB in order to meet its 2030 target.

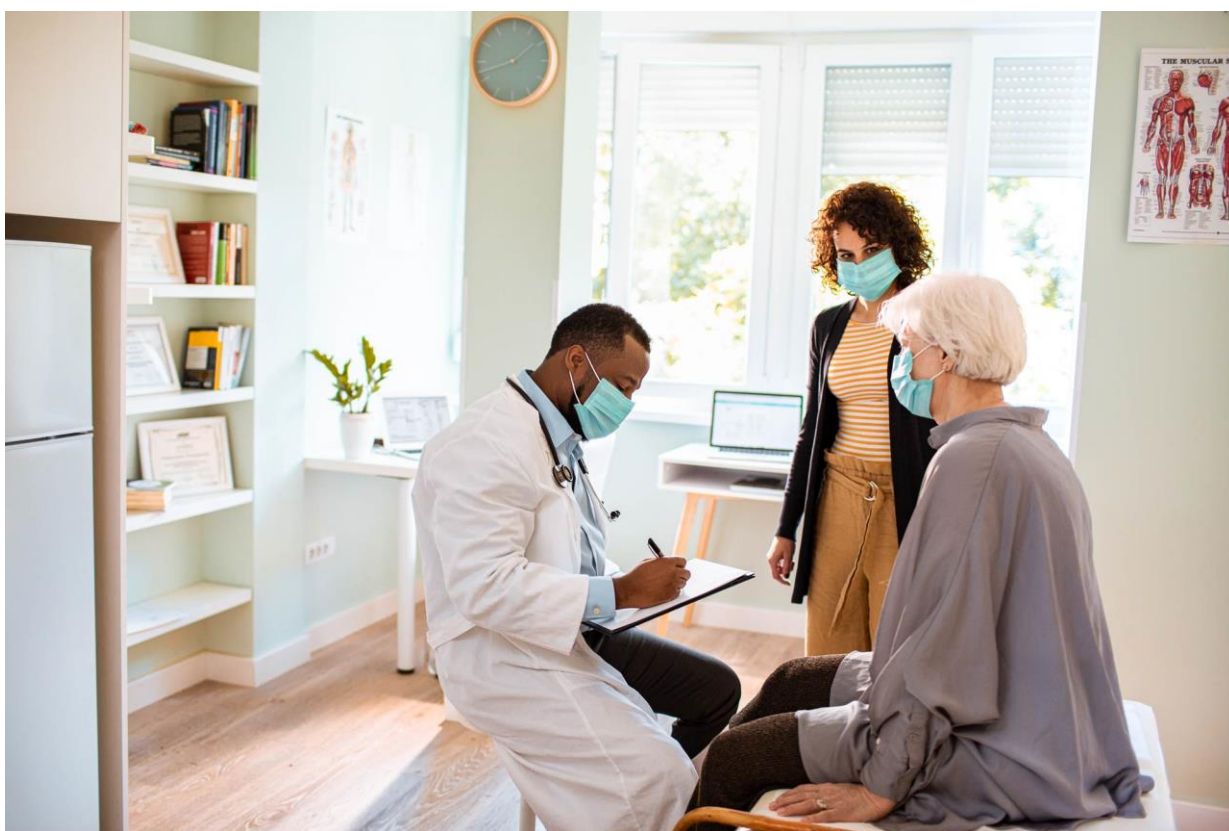
Although these initiatives, if implemented, are likely to result in strong carbon reductions, especially when measured against the strategic delivery plan target, there is still a long way to go in achieving net zero emissions by 2030. Future delivery and action plans will need to increase the level of ambition and look to reduce emissions even further and faster.

4. HDUHB Strategic Direction 2022-2032

The NHS Wales Decarbonisation Strategic Delivery Plan (SDP) structures decarbonisation of NHS Wales into six main activity streams:

- Carbon Management
- Buildings
- Transport
- Procurement
- Estate Planning and Land Use
- Approach to Health and Social Care by all partners in the Public Sector Service Board
- One Health

Within the Technical Appendices of the DSDP initiatives (decarbonisation activities or projects) are listed for each activity stream. The structure above has been followed in this, and subsequent, sections of the report and those initiatives applicable to Health Boards & Trusts in the SDP are set out alongside commentary on how these apply specifically to HDUHB. The initiatives included within the activity streams will often provide carbon reduction across several footprint categories.



4.1. Carbon Management

Initiative 1: *Identify and Adopt where appropriate best practice carbon management with dedicated roles in place to undertake Delivery Plan initiatives.*

Clear governance structures within HDUHB are essential to the effective implementation of this delivery plan, and the success of future decarbonisation initiatives. HDUHB will improve upon the already well-established carbon management structures and put in place further dedicated and appropriately skilled resource that can deliver best practice carbon management. The key actions outlined in this report are also assigned to key roles, and/ or groups, so that the initiatives can be implemented efficiently. The Welsh Health Environment Forum can also be a key mechanism to support best practice carbon management and learning for decarbonisation initiative implementation.

Initiative 2: *Proactively communicate the Climate Emergency to staff and the public with the aim of stimulating low carbon behaviours and growing engagement in the decarbonisation agenda.*

The communication of decarbonisation initiatives and the presentation of successful case studies to Health Board staff, and the public, is an important step to achieving long-term decarbonisation targets. The proactive communication of the climate emergency, and of the steps HDUHB are taking to address it, can increase engagement in emission reduction initiatives and help towards their success. It can also provide education and learning opportunities that can help drive positive behaviour change. This in turn can further contribute to emission reductions across the Health Board's activities.

The Health Board is already engaged in several education and behaviour change initiatives, such as the Carbon Awareness Programme now adopted by NHS Wales. The key actions presented in this decarbonisation delivery plan will expand on the measures already in place with a view to further increasing engagement and education of both staff and the public.

Initiative 3: *Drive the engagement required for decarbonisation across each organisation's leadership team – Finance, Procurement, Estates, and Capital Project teams will engage to develop a focussed and active approach to project implementation.*

A key aspect of the formation of this delivery plan was the workshops held with senior members of the estates, finance, procurement, capital projects and transport teams. These workshops helped to drive engagement amongst senior staff in decarbonisation initiatives and also allowed for key opportunities and barriers to implementation to be identified and discussed. These workshops had a fundamental role in the key actions detailed within this report.

Many senior staff members within HDUHB have high levels of engagement in meeting the decarbonisation ambitions of the Health Board. However, a key focus of this delivery plan, and for the Health Board moving forward, is to maintain momentum and increase engagement further across the Health Board. Central to this is engagement with senior staff and leadership teams to facilitate a top-down approach to implementation. This will be equally driven by a bottom up behaviour change and peer pressure approach to improve every person's accountability and responsible actions.

Additionally, the key initiatives within this delivery plan have been divided into 6 key categories (as per the NHS Wales DSDP) to further highlight the actions that each leadership team are responsible for and need to undertake before the next delivery and action plan.

4.2. Buildings

Buildings account for the majority of the Health Board's Scope 1 & 2 carbon footprint. Emissions from buildings totalled 22,674 tCO₂e in the FY 18/19 carbon footprint, with just over 46% of this coming from gas usage and a further 22% from electricity use. The emissions from buildings within the Health Board's estate can be broadly split into two categories: existing buildings with retrofit solutions, and new builds and major refurbishments. This delivery plan follows the NHS Wales Decarbonisation Strategic Delivery Plan by exploring actions with regards to buildings under these two subcategories; Existing Building Retrofit and New Builds and Major Refurbishment.



4.2.1. Existing Building Retrofit

Initiative 4: Progress a transformational energy and water efficiency retrofit programme across the estate – every building with a long-term future will have undergone a feasibility study to identify prospects for a multi-technology energy-efficient upgrade by 2030.

As a key part of the work to develop this Delivery Plan, Carbon Trust Engineers conducted an energy and carbon audit of HDUHB's estate, which included site visits to the four Acute General Hospitals, which account for approximately 80% of HDUHB's Scope 1 and 2 emissions. Due to their size, age, energy consumption and carbon footprint, retrofit of Acute General Hospitals has been prioritised within this initial Delivery Plan. The remaining sites (categorised as: Community Hospitals, Specialist Hospitals, Health/Treatment Centres, Support Facilities, Non-Hospital (Patient Facilities) and Disposals) will also offer decarbonisation opportunities.

Energy and carbon audits will be carried out every two years to inform biennial Delivery and Action Plans. These will take account of any operational changes within HDUHB, as well as changes in technology and market conditions to provide HDUHB with an up-to-date list of decarbonisation actions that will need to be implemented to maintain progress towards targets. As a result of implementing subsequent Action Plans, every building with a long-term future will have undergone a multi-technology energy-efficient upgrade by 2030.

Initiative 5: Where appropriate *replace existing lighting with LED lighting by 2025. (This will be reviewed in line with recent installations and strategic development plans)*

Artificial and natural lighting was appraised during energy and carbon audits of the Acute General Hospitals and the impact of LED upgrades (where not already implemented) has been quantified and included in the 2022-24 Action Plan. As a next step, HDUHB will need to procure LED lighting solutions for these sites (inc. design, supply, installation, and commissioning).

Similar lighting audits will be required to inform lighting upgrades across the rest of the estate, which should be implemented by 2025 (unless sites meet the above exception).

Initiative 6: Complete expert heat studies by the end of 2023 for all acute hospitals to set the plan to transition away from fossil fuel heat sources.

HDUHB will need to commission low carbon heat specialists to develop a low carbon heat evolution plan for each of the four Acute General Hospitals. This should be done as a matter of urgency.

Initiative 7: Progress business cases for low carbon heat generation for all non-acute sites larger than 1,000m² by 2030.

The conversion of the incumbent fossil fuel heating systems across the non-acute sites larger than 1000m² to low carbon heating by 2030 represents a considerable challenge for all Health Boards in Wales, including HDUHB. Significant funding will need to be released from both Welsh and UK governments to achieve this, however, in the short term HDUHB will need to commission low carbon heat specialists to evaluate each site individually for its transition to low carbon heating. As per *Initiative 6*, HDUHB should undertake this as a matter of urgency with a view to converting appropriate sites by 2030.

Initiative 8: No further natural gas CHP plant will be installed – renewable CHP will be championed instead. Subject to site energy security, existing CHP plant maybe decommissioned once funds and installation of alternative heat and power allows and this is part of the major refurbishment of infrastructure plans from 2025, with the ambition for all gas CHP to be decommissioned by 2030.

The use of CHP at the acute sites has been an effective management strategy in terms of both financial and carbon emissions saving for decades. However, with the significant reductions in the carbon intensity of the national electricity grid, it no longer offers the historical carbon savings against electricity. CHP plants now emit more carbon emissions than fossil fuel heating and grid supplied electricity alone, with this disparity only set to increase further in the coming years. As a result, HDUHB will not install new CHP systems at any of its sites.

Many of the CHP units currently installed are approaching their end of service lives, providing a good case for decommissioning. However, the cost savings of using CHP over standard fossil fuel and electric heating is significant for the Health Board. The constraints over available financial budgets, coupled with the recent high energy price inflation, will be compounded with the decommissioning of CHP plant. HDUHB will therefore need to undertake appropriate carbon and financial modelling when considering the decommissioning of CHP units, with a view to complete estate wide decommissioning by 2030.

Initiative 9: Take an active approach to efficient control of energy in our buildings. All buildings will move towards up-to-date, standardised, and effective building management systems (BMS). HDUHB Decarbonisation PMO will champion adoption of energy by BMS control by 2024.

The use of up-to-date and effective building management systems can provide building managers with high resolution data and detailed controls over building operations. This can lead to substantial carbon emission savings, especially over large buildings such as the acute hospital sites. The use of best

practice operations carried out by trained staff members is central to the effective operation of BMS technology.

The BMS systems currently in use at the HDUHB acute hospital sites are now all in need of significant investment. BMS system refurbishment, and/or replacement, should be a priority at the highest levels of HDUHB. However, it is also important to consider the existing infrastructure when upgrading BMS systems. There may also need to be infrastructure upgrades concurrently with BMS upgrades to allow the effective control and optimised operation that can be achieved by modern BMS systems. A holistic approach is necessary for system upgrades and it is important to note that this will likely substantially increase the costs required for upgrades.

Initiative 10: Determine the overall viable potential for onsite renewable energy generation at each NHS organisation by 2023. Subject to feasibility and resources HDUHB ambition is to Install a significant proportion of this potential in place by 2027, and have majority of energy supply by 2030.

HDUHB has worked very closely with the Welsh Government Energy Service (WGES) in recent years and has already identified a large proportion of available renewable energy projects (primarily solar PV). A number of these projects are already installed, with others nearing completion or at implementation stage. During this delivery plan period the remaining projects already identified will be installed.

HDUHB could achieve annual electricity savings of 1,353,670 kWh once all the planned solar PV projects are commissioned. This has the ability to save 353 tCO₂/yr from the emissions associated with electricity from the footprint. An appropriate strategy will be put in place to ensure that the operation and maintenance of all renewable energy generation systems are carried out effectively. HDUHB will continue its relationship with the WGES and look to identify all remaining feasible renewable energy generation projects.

4.2.2. New Builds and Major Refurbishment

Initiative 11: Develop and build low carbon buildings to net zero standard – engage and collaborate with NHS partners across the UK on the emerging net zero building standard for hospitals, and adopt a net zero building accreditation approach which will be defined by 2024.

Considering the lifespan of many healthcare buildings, it is important that any new buildings are built to net zero standards if NHS Wales is to meet its 2030 decarbonisation ambitions. HDUHB is already making this a priority as the forthcoming Cross Hands development will be built to a net zero carbon (operation) standard. This initiative is also of importance to HDUHB as there are plans for a new acute hospital site to be constructed towards the end of this decade, which will have a fundamental impact of the Health Boards overall carbon footprint. HDUHB will keep engaged with NHS partners so that any emerging net zero building standards and accreditations are adopted within any new buildings.

Initiative 12: All project teams to have an independent client-side sustainability representative to provide due diligence support for the optimal low carbon design across all development stages – and be responsible for ensuring the Net Zero Framework process is followed.

Given the importance of the built environment within the overall carbon footprint (see Figure 2) any new buildings will need to achieve net zero standards. The complexity of new healthcare buildings, and the holistic approach required for low carbon design, will necessitate a dedicated resource to ensure that the relevant design considerations are being met with regards to carbon emissions, and that any relevant net zero frameworks and standards are being followed. This will involve a dedicated client-side

sustainability representative whose position will be required in all project teams and will sit across all design stages for new developments and major refurbishments from 2023.

Initiative 13: *Integrate Modern Methods of Construction (MMC) into the design and construction of new buildings – this will consider modular design, offsite fabrication, and just-in-time delivery to minimise construction-related carbon emissions.*

Many of the buildings within the Health Board's estate have been constructed with traditional building techniques. However, there have been a range of technological advancements in recent years in terms of building design and construction that can have beneficial impacts on the carbon footprint of new buildings. These modern methods of construction (MMC) can, in many instances, achieve faster build times, fewer storage requirements, fewer transportation miles, use of less environmentally impactful materials (with fewer embodied carbon emissions), and even cost savings compared to some traditional building techniques. It will be important to maintain a holistic view to new building construction in the ambition to become net zero by 2030 and the use of MMC is one area that will be considered by HDUHB moving forward.

Initiative 14: *Install electric vehicle charging points in new developments to best practice designs, and future-proof new car parks by installing infrastructure to enable straightforward installation of future charging points.*

Transport emissions account for 19% of HDUHB's overall carbon footprint. A key avenue for decarbonisation in this sector is the electrification of the vehicle fleet and the ability for staff and patient/ visitors to be able to utilise electric vehicles. A robust and appropriate charging infrastructure will be fundamental to achieving decarbonisation of transport. All new car parks at HDUHB will have EV charging incorporated and future-proofed infrastructure to allow increased EV charging capacity in the coming years. The installation of EV charging is also important so that the infrastructure does not become a barrier to the use of EVs in the future as they become commonplace.

Initiative 15: *Prioritise low carbon heating solutions as a key design principle. Wherever possible fossil fuel combustion systems are not to be installed as the primary heat source.*

New buildings or major refurbishments represent excellent opportunities to incorporate low carbon heating that can often be complex and much more expensive to retrofit into older buildings. By prioritising low carbon heating as a key design principle this can inform the build/ refurbishment so that the low carbon heating is optimised, and carbon emissions are minimised.

Initiative 16: *Incorporate the principles of sustainable transportation into the design of new sites (in addition to electric vehicle infrastructure) in line with the Welsh Government's Active Travel Action Plan for Wales.*

The Welsh Government's Active Travel Plan for Wales seeks to increase the levels of active travel (walking and cycling) that happen within Wales, and to take advantage of the physical and mental health benefits that active travel brings. Considering the health benefits of active travel, it is important that any new buildings within the Health Board's estate look to maximise the ability for building users to use walking or cycle routes for access. The provision of EV charging at new sites will also allow for more sustainable transport options to be used where active travel may not be appropriate. HDUHB will incorporate sustainable transport options to all new build and will continue its work to improve sustainable and active travel at its existing properties.

4.3. Transport

Initiative 17: NWSSP will work with Health Boards and Trusts to develop the best practice approach for EV charging technology, procurement, and car park space planning – this will include consideration of NHS Wales’s own fleet, staff vehicles, and visitor EV charging.

It is important that Health Boards and Trusts in Wales have a best practice approach to EV charging technology, procurement, and car park space planning so that there is a standardised approach that enables easy transitions for those that use multiple services across the NHS Wales sites. HDUHB will engage with NWSSP to make sure there is good visibility of the actions being taken at HDUHB and to ensure these actions are being implemented following best practice. Additionally, this communication will allow HDUHB to receive learnings from other Health Boards also taking action.



Initiative 18: A standardised system of vehicle management for owned and leased vehicles will be developed to plan, manage, and assess vehicle performance – this will entail central fleet management oversight within each organisation.

Effective fleet management is crucial to obtain high resolution vehicle data that can then be integrated so that emission reduction opportunities can be identified. 27% of HDUHB’s transport emissions are associated with the Health Board’s fleet. Understanding what the fleet vehicles are doing can help transport managers in their ambition to decarbonise through reducing the mileage from these vehicles or converting appropriate vehicles over to battery electric vehicles (BEVs).

Initiative 19: All new cars and light goods fleet vehicles procured after April 2023 will be battery-electric or hybrid wherever practically possible. In justifiable instances where this is not suitable, ultra-low emission vehicles should be procured.

Following its ambition to decarbonise transport, HDUHB has already started on its journey to decarbonise its own vehicle fleet through the procurement of 7 electric vehicles in 2022. The Health

Board will continue to follow the existing procurement schedule through prioritising EVs wherever possible with ultra-low emission vehicles (ULEV) procured where this is not possible or feasible.

Initiative 20: *All new medium and large freight vehicles procured after April 2025 will meet the future modern standard of ultra-low emission vehicles in their class.*

Medium and large freight vehicles can be harder to decarbonise than smaller vehicles due to their size and the lack of available commercial technology. They are, however, still an important contributor to carbon emissions so it is important to develop an approach to decarbonise this sector in the coming years.

Initiative 21: *H DUHB will appraise the use of staff vehicles for business travel alongside existing pool cars and will update business travel policies to prioritise the use of electric or hybrid pool cars, electric private vehicles and public transport.*

Business travel represents a relatively small proportion of HDUHB's overall carbon footprint at 3% (see Figure 4). However, it is a sector under the control of the Health Board and where emission reductions can be achieved through effective policies and initiatives. Given the geographic conditions of the Health Board, business travel is a necessity for many members of staff. Despite this, HDUHB currently has a culture of sustainable business travel that has helped keep emissions from business travel relatively low. However, the existing processes lack an accompanying official policy that reinforces the decisions that are currently being made. Actions like as this, along with innovative solutions such as incentives/disincentives could help further reduce the emission attributed with business travel for HDUHB.

Initiatives 22, 23 and 24¹

¹ Initiatives 22, 23 and 24 relate to Welsh Ambulance Services NHS Trust (WAST) activities. These initiatives fall under the responsibility of WAST, as detailed in the NHS Wales DSDP, and so are not considered within the scope of this delivery plan.

4.4. Procurement

Initiative 25: NWSSP will transition to a market-based approach for supply chain emissions accounting.

Given that emissions from the supply chain account for 62% of NHS Wales's and 58% of HDUHB's total carbon footprint (see Figure 2) it is important that there are significant instruments in place to address these hard to decarbonise emissions. HDUHB has already made progress in addressing its supply chain emission through contacting the 100 largest suppliers (by value) to better understand their decarbonisation actions. HDUHB has also incorporated the recent Welsh Government Policy Procurement Notes 06/21 and 12/21 into its tender processes and is working towards a template for tenders that strongly considers decarbonisation. Close collaboration with NWSSP and the forthcoming Welsh Government Procurement Workstream will be important moving forward in this space that has significant overlap between different departments and various NHS Wales organisations.

Initiative 26: NWSSP will expand its current Sustainable Procurement Code of Practice to include a framework for assessing the sustainability credentials of suppliers.

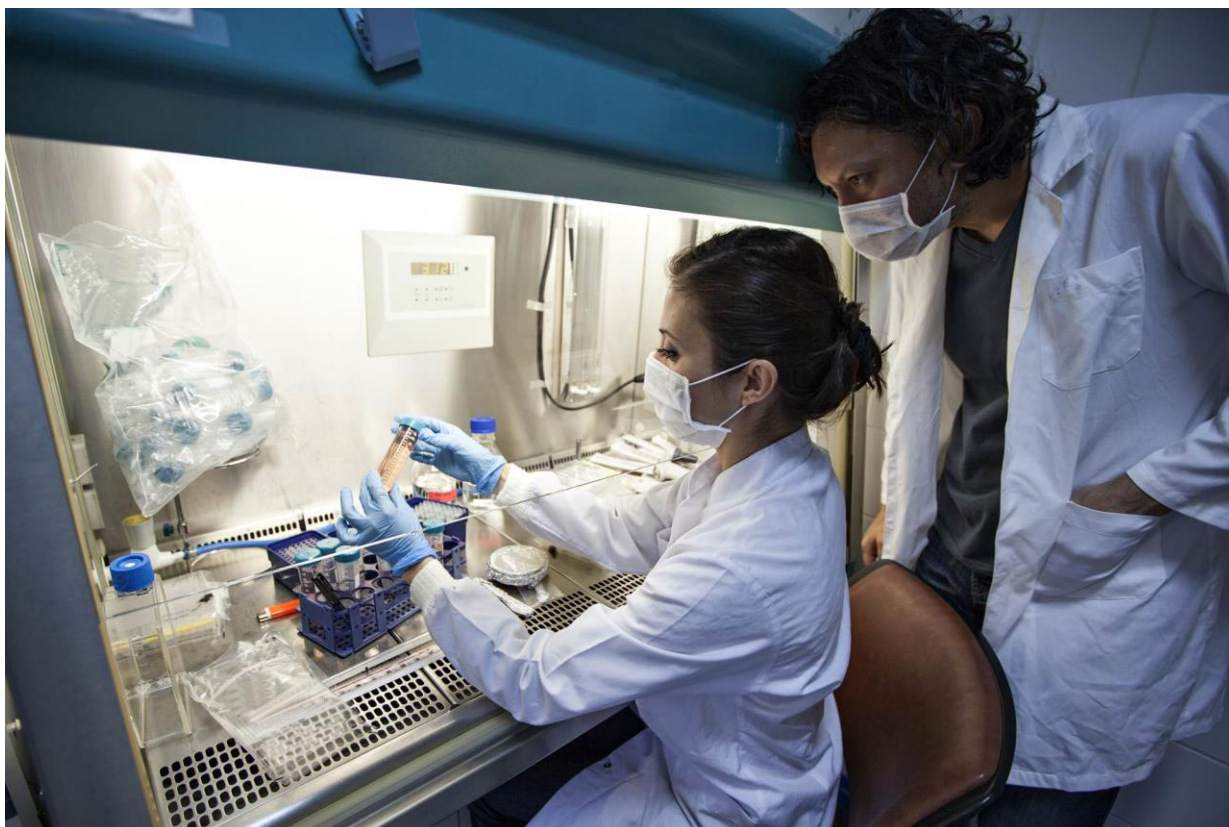
To ensure carbon emission reductions are accurately reflected in tender and other procurement documents, NWSSP and the All Wales Medicines Strategy Group have developed a new framework to address this. HDUHB will incorporate this strategy in Health Board level procurement decisions, which will help the Health Board assess the sustainability credentials of suppliers and reinforces the commitment of NHS Wales to achieve ambitious emissions reduction across the supply chain. It will also be important for the Health Board that relevant staff are well trained in best practice approaches to assessing the sustainability credentials of suppliers. Additionally, issues surrounding an individual product's carbon footprint will be an important consideration (where available) when procuring sustainable products. The avoidance of single use items will need to be viewed alongside any best practice guidance for infection control.

Initiative 27: Value to the local supply chain will be maximised, whilst maintaining high standards for goods and services.

Supporting the local supply chain is a key initiative at both NHS Wales and Welsh government levels. Regional Welsh supply chains have the ability to reduce emissions through reduce transport emissions and lower carbon intensities from energy use than some larger more globalised supply chains. They also have the ability to provide many high-quality products so the high standards required by NHS Wales are maintained. HDUHB can take guidance from NWSSP on how best to assist and look to positively contribute to supporting this initiative wherever possible. It is also important that the whole supply chain is considered to ensure that local value chains are not using raw materials that have higher emissions (cradle-to-gate) prior to the shorter transportation routes.

Initiative 28: 100% REGO-backed electricity will be procured by 2025, and 100% offset gas by 2030.

Procuring electricity from REGO backed sources is an important step in helping drive the renewable energy industry in the UK. Support for renewables can contribute to the faster adoption of low carbon electricity generation and the phase out of fossil fuel energy generation. This in turn will help the Health Board reduce its Scope 2 emissions in the future as the carbon intensity of the national grid is lowered. Electricity procurement decisions are made at the national level, however, HDUHB fully supports the procurement of REGO-backed electricity and will look to assist national level actions wherever possible.



Initiative 29: NWSSP Procurement Services will embed NHS Wales's decarbonisation ambitions in procurement procedures by mandating suppliers to decarbonise.

Incorporating the decarbonisation ambition of NHS Wales through both the governance structure and procedures of NWSSP, and HDUHB procurement, teams will be crucial to the success of achieving emission reduction across the supply chain. HDUHB will work closely with NWSSP to make sure that procurement procedures are appropriately account for decarbonisation and will start to mandate suppliers to proactively decarbonise. Open and clear communication with suppliers will be important to the success and uptake of decarbonisation measures across the supply chain.

Initiative 30: Sustainability will be embedded within strategic governance – NWSSP Procurement Services will work across Wales to champion decarbonisation in the supply chain, and influence decarbonisation ambitions for buildings and transport.

To achieve significant and sustainable emission reductions over the long term it will be important that decarbonisation ambitions become embedded in the governance and decision-making processes of both NWSSP and the Health Board. Regularly reviewing the progress of this action plan and integrating the review progress with other annual reporting will help incorporate decarbonisation within wider reporting metrics. It is also important that responsibility for sustainable procurement is taken at senior management level with a responsibility to report to director level. This will help embed decarbonisation within the governance structure, guide implementation and contribute to the success of this delivery plan.

Initiative 31: *NWSSP Procurement Services will improve supply chain logistics and distribution to reduce the carbon emissions from associated transport.*

Emissions from deliveries to Health Board sites contribute to the overall carbon footprint and to the NHS Wales footprint. Through centralised storage and distribution, such as the new IP5 storage, these transport emissions associated with deliveries can be reduced. Bulk deliveries from a centralised depot have the potential to reduce the number of large deliveries and also allow for efficiencies to be achieved in onwards distribution. A revised approach to stock management will need to be incorporated at the Health Board level so that logistics with IP5 storage can be optimised.

Initiative 32: *NWSSP Procurement Services will actively develop and support procurement requirements to support implementation of this Delivery Plan.*

Given the highly interconnected nature of procurement between NWSSP and HDUHB it will be crucial that close collaboration exists between both organisations to support the implementation of this decarbonisation action plan. The success of driving emissions reductions from procurement will necessitate engagement from both NWSSP and HDUHB and may require specific frameworks to be created for certain sectors such as EVs and infrastructure, renewable power, low carbon heat, local supply chains, and low carbon ICT procurement. HDUHB's procurement team, and relevant senior leadership teams, will continue to work closely with NWSSP to actively engage with new procurement requirements, support cross-cutting initiatives, and communicate learnings to drive emissions reductions across the whole supply chain.

4.5. Estate Planning and Land Use

Initiative 33: *The Health Board strategic estate planning will have carbon efficiency as a core principle – quantified carbon will be a key decision metric for planning new developments, rationalisation of the estate, and championing smart ways of working.*

Strategic estate planning that appropriately accounts for carbon efficiency as a core principle can not only reduce emissions directly but also determine what carbon emissions will be locked in for years to come with decisions regarding long-term assets. HDUHB already has strategies in place for rationalisation of the estate and for the strategic direction of the Health Board with positive steps already being taken such as the current engagement with the Bronglais Public Sector Group. It will be important that all future decisions take appropriate account of decarbonisation and tools such as the net zero framework can be used so that decarbonisation is a principal consideration. This will require engagement from senior management and will require action on decarbonisation to be embed across the whole organisation and in all decision-making processes.

Initiative 34: HDUHB will work closely with **NWSSP and Welsh Government on an appraisal approach for allocating land for uses such as renewable energy generation, greenhouse gas removal and afforestation and to maintain green space and utilise land for decarbonisation, including collaborating with neighbouring landowners.**

In a holistic assessment of carbon emissions, it is important to consider not only the built environment and Health Board operations but also the effects land use can have, both positive and negative. It will be important for HDUHB to carry out a land evaluation survey to identify the areas of the existing estate for potential renewable energy generation and for GHG removals, which will play an increasingly significant role in the years to come. Areas of green space can increase biodiversity and can also contribute to better physical and mental health for users of the space, whilst helping to reduce carbon emissions. It will be important for HDUHB to collaborate with local authorities and neighbouring landowners to effectively manage green space to maximise biodiversity, health benefits and carbon emission reductions. HDUHB will also engage with NWSSP and Welsh Government so that a standardised and best practice approach is followed for assessing land use possibilities.



Initiative 35: HDUHB will work with *NHS Wales and Welsh Government as well as strategic partners to explore and progress large scale renewable generation with private wire connection to our sites.*

HDUHB has worked closely with the Welsh Government Energy Service in recent years and have already identified a number of renewable energy projects. To date, many of these have been installed with several others at implementation or planning stages. Continued work with the energy service will be required to complete a detailed feasibility of the whole Health Board estate, as well as investigations into the potential to work with local authorities and neighbouring land owners with a view to maximising renewable energy generation. HDUHB will endeavour to install 50% of the identified viable projects by 2026 and 100% by 2030, should funding be available. With increased renewable energy projects under the control of the Health Board it will also be important that HDUHB has an effective strategy for the maintenance and operation of these assets.

4.6. Approach to Healthcare

Initiative 36: *Our approach to 21st-century healthcare will be central to the design of new hospital developments – redesigning the whole journey with care closer to home in a carbon-friendly primary care estate with a reduced need to visit hospitals.*

To effectively reduce emissions to a minimum, a new service model must consider a shift in the way that care is delivered. HDUHB is committed to working with WG Capital, Estates and Facilities to ensure that its estate caters to the modern healthcare journey.

Initiative 37: HDUHB will *support the Welsh Government's target for 30% of the Welsh workforce to work remotely[i], by continuing to facilitate flexible and smart working, developing the existing approach to remote working technology, and rationalising existing office space.*

HDUHB has established an Agile and Hybrid Future Policy, Accommodation and Projects Task and Finish Group to develop an approach to remote/hybrid working. Hot desk environments have already been set up at some sites and this practice will be expanded going forward. An assessment is currently being undertaken to review the possibilities to transform office space into additional healthcare facilities. Opportunities to work with external partners to share and utilise office space are also being developed.

Initiative 38: HDUHB will *continue to utilise technology to increase the efficiency of engagements between staff and the public where suitable.*

HDUHB will continue to build upon the progress made during the Covid-19 pandemic in the following ways:

- Maintain the use of digital consultations and patient monitoring where possible to reduce the requirement for avoidable staff and patient travel - where medically appropriate.
- Use technology alongside the 111 service to support patient triage, information gathering, and to signpost patients to appropriate health services.
- Ensure healthcare professionals are provided with the appropriate technology to carry out these tasks effectively.
- Take advice from NHS Wales to the best practice use of digital technology; and
- Continue the process of digitalisation of health records, which has already begun, and will continue throughout the Action Plan period.

Initiative 39: *Health education will be used to champion decarbonisation across our service – we will encourage sustainable healthcare practice, waste efficiency, and low carbon staff and patient behaviour.*

HDUHB will contribute to the development of local and national sustainability resources and engage with partners to provide staff education. HDUHB will support and facilitate staff behaviour change to improve sustainable quality improvement. HDUHB will continue to provide space internally for sustainability-focussed working groups. HDUHB will engage with green health networks and look to incorporate wider One Health approaches to sustainable recovery & development at the Health Board level.

Initiative 40: We will continue to *support the work of existing working groups such as the Welsh Environmental Anaesthetic Network to raise awareness of the carbon impact of medical gases and transition to a culture where gases with low global warming potentials are prioritised.*

HDUHB will consult with Welsh Environmental Anaesthesia Network (WEAN) and senior medical staff to evaluate their existing trials to reduce emissions associated with anaesthesia and help develop an

approach to expand best practice across all of Wales. It will also work with the All Wales Medicines Strategy Group to assist with the implementation of an Environmentally Friendly Medical Gas Policy.

Initiative 41: HDUHB will continue to ***explore methods of minimising gas wastage and technologies to capture expelled medical gases.***

HDUHB will ensure medical gas capture technology is integral to all new builds and major refurbishments.

Initiative 42: HDUHB will continue to ***take a patient-centric approach to optimise inhaler use, focusing on a reduction in the over-reliance of reliever inhalers where possible and emphasising the importance of inhaler-specific disposal and recycling.***

HDUHB will seek guidance from the All Wales Medicine Strategy group and RHIG on this initiative.

Initiative 43: HDUHB will continue to ***transition the existing use and distribution of carbon-intensive and high global warming potential (GWP) inhalers to alternative lower GWP inhaler types where deemed suitable.***

HDUHB will seek guidance from the All Wales Medicine Strategy group and RHIG on this initiative.

Initiative 44: HDUHB will ***support the NHS Wales development of guidance by 2023 for best practice reduction of pharmaceutical waste.***

HDUHB will work with NWSSP and ensure best practice initiatives for the reduction of pharmaceutical waste are implemented once finalised. HDUHB will also collaborate with other Health Boards and Trusts to ensure a standardised approach.

Initiative 45: HDUHB will partner NHS Wales to ***develop a 'plastics in healthcare' initiative to address waste in the delivery of health care – this will aim to tackle PPE, single use plastics, and packaging waste.***

HDUHB will work with NWSSP and ensure best practice initiatives for plastics in healthcare are implemented once finalised. HDUHB will consider second life possibilities for non-medical equipment that is no longer required. Reuse elsewhere within the Health Board and donation will be prioritised over creation of waste. This will be incorporated into Health Board policy.

Initiative 46: HDUHB will ***engage with pharmacists and prescribers to build upon and support existing efforts to encourage responsible disposal of inhalers through discussions with patients, information leaflets, posters and media.***

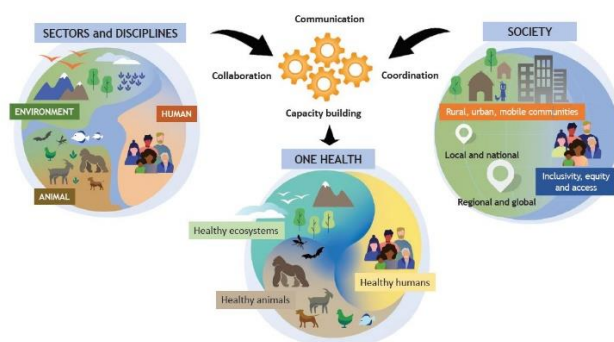
HDUHB will introduce additional inhaler-specific disposal facilities in hospitals in partnership with industry stakeholders. It will also support the work of groups such as the Welsh Respiratory Health Implementation Group and the International Pharmaceutical Aerosol Consortium to emphasise the importance of responsible disposal with regard to carbon emissions and encourage pharmacists and prescribers to stress the importance of responsible disposal to their patients, and the fact that even low carbon inhalers need to be disposed of properly. It will also make use of the existing RHIG digital app to effectively communicate with patients.

4.7. One Health

Hywel Dda University Health Board in partnership with Public Health Wales have adopted a One Health approach.

One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems so that they are better prepared to prevent, predict, detect, and respond to global health threats and promote sustainable development. One Health recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent.

The One Health approach mobilizes multiple sectors, disciplines and communities throughout society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air as well as safe and nutritious food, taking action on climate change, and contributing to sustainable development.



The Chief Medical Officer (CMOW) for Wales Special Report (January 2021) recommends Wales should adopt a One Health approach to sustainable development as part of the response to threats from climate change, zoonoses, antimicrobial resistance, as well as food, water, safety and security. The CMOW envisions One Health alongside The Wellbeing of Future Generations Act is a vehicle for embedding sustainable development into our planning in Wales for future generations

One Health will integrate multiple disciplines across Hywel Dda partnerships for Health and Care and bring together partners from the wider public human, animal and environmental sectors to work on issues that intersect these domains, including food, climate change and threats from infectious diseases.

Because of its close alignment with Sustainable Development principles, Climate Change and Decarbonisation, there is an opportunity for One Health approaches to complement existing partnerships as well as create new partnerships on system-wide issues that cross the human-animal-environmental interface.

The Well-being of Future Generations Act promotes increased understanding of sustainable development and provides the statutory framework enabling a 'golden thread' ensuring an integrated One Health approach. Public Bodies' well-being objectives and Well-being Plans will increasingly address creating 'A Resilient Wales' which includes biodiversity, green spaces, water and air quality and healthy functioning ecosystems.

Hywel Dda One Health vision is to ensure global security and enable sustainable wellbeing and has structured its One Health approach into four key themes:

- Theme 1: Food system
- Theme 2: Climate change and green solutions
- Theme 3: Health protection and emergency resilience
- Theme 4: Innovation, education and development

Further information on the Global One Health approach of the World Health Organisation may be found [here](#) and One Health in Hywel Dda may be found at [here](#).

5. Decarbonisation Action Plan 2022-25

This section of the report sets out the decarbonisation actions that will be implemented by HDUHB to March 2025 (and, in some instances, beyond) to align with the NHS Wales Decarbonisation Strategic Delivery Plan and IMTP, along with key delivery dates and responsibilities. **Successful implementation of this Decarbonisation Delivery Plan will require a step-change in decarbonisation activity across HDUHB, to be appropriately resourced, and require significant additional funding from Welsh Government to support with the delivery and achievement of established targets.** Responsibilities are highlighted as these will need to be agreed and signed off by HDUHB. All actions have been linked back to the relevant initiative within the NHS Wales Decarbonisation Strategic Delivery Plan for ease of reference. While it has not been possible to quantify every action in the 2022-25 Action Plan, wherever possible this has been done, and the results are summarised below in Table 1. The capital/investment costs stated below are based on the application of technical principles and professional evaluation and in some instances are conditioned by data limits, scope of work and time. Some actions will require verification and detailed assessment prior to proceeding with implementation. For a more detailed breakdown of actions, see Appendix 2.

Table 1: Summary of 2022-25 Action Plan (The indicative costs in the above table will be subject to further refinement at the time of the project to reflect inflationary impact and the outcome of feasibility into detailed design.)**

Area	Est. Benefits			Est. Capital Costs 2022-25 (£)	Est. 10 year Carbon Savings (tCO ₂ e)
	£	tCO ₂ e (2021)	Activity (unit)		
Carbon Management	**£218,400	600	2,768,700 kWh	TBC	4,300
Buildings	**£1,509,200	2,500	11,624,900 kWh	£6.5m	18,300
Transport	**£89,700	300	96,000 litres - 148,100 kWh _e	£2.1m	2,000
Procurement	TBC	8,500	TBC	£100k	62,600
Estate Planning & Land Use	TBC	TBC	TBC	TBC	TBC
Approach to Healthcare	TBC	TBC	TBC	TBC	TBC
Total	£1,817,400**	11,800	TBC	£8.7m	87,200

While emissions reductions will need to be achieved across the Health Board to align with Net Zero 2030, buildings account for the majority of HDUHB's Scope 1 & 2 carbon footprint and, crucially, are under HDUHB's direct control. Decarbonisation of buildings therefore presents an opportunity for HDUHB to make significant and early progress towards Net Zero. The buildings within HDUHB's estate can be broadly split into two categories; existing buildings (where retrofit solutions are required), and new builds and major refurbishments. This delivery plan follows the NHS Wales Decarbonisation Strategic Delivery Plan by exploring actions with regards to buildings under these two sub-categories.

HDUHB has a significant number of built assets that span a wide range of applications and construction years, with many sites that were not constructed to the same energy efficiency standards that are currently in place for new buildings. The wide variety in building types and energy efficiency standards of the property portfolio necessitates a targeted action plan that can achieve emission reductions across the built estate as well as specific measures to maximise decarbonisation on a building-by-building basis. It is important that the carbon reductions are prioritised in existing building retrofits and that business cases are not solely driven on cost savings, with some cases even resulting in increased costs to be expected. Additionally, strategy at NHS Wales level is that uncertainty to the future of built assets should not be a cause for inaction over decarbonisation initiatives. The estimated savings identified through audits at each acute hospital site, and associated capital costs, are summarised below in Table 2. For a more detailed breakdown of costs and savings by measure, see Appendix 2.

Table 2: Financial efficiencies and costs identified through audits of acute sites (refer to comment in Table 1)**

Acute Hospital	Estimated Benefits			Est. Capital Costs 2022-24 (£)	Est. 10 year Carbon Savings (tCO ₂ e)
	£	tCO ₂ e (2021)	kWh		
Bronglais	**197,200	240	1,115,200	451,300	2,000
Glangwili	**345,200	780	3,051,400	1,444,100	7,300
Prince Philip	**239,300	650	3,376,900	1,386,200	6,200
Withybush	**274,300	520	2,617,800	830,000	4,800
Solar PV (multi-site)	**287,100	300	1,142,400	1,779,700	2,100

Carbon Management

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
1. Identify and Adopt where appropriate best practice carbon management with dedicated roles in place to undertake Delivery Plan initiatives.	Assign responsibility for the implementation of this Delivery Plan to a responsible role within HDUHB and provide necessary resources to deliver all actions	Decarbonisation Task and Finish Group	March 2023
	Undertake monthly Action Plan progress reviews and utilise the Welsh Health Environment Forum to support delivery.	Decarbonisation Task and Finish Group	2022/23
2. Proactively communicate the Climate Emergency to staff and the public with the aim of stimulating low carbon behaviours and growing engagement in the decarbonisation agenda.	Current Building Management Systems need replacement to ensure best practice and optimum operation at all four acute hospital sites. Building and energy managers should be provided with user training as part of contractor handover.	Estates & Facilities	By 2025
	Ensure electric cycling infrastructure is installed in existing cycling storage facilities across all sites.	Transport Team/ Estates & Facilities	By2025
3. Drive the engagement required for decarbonisation across each organisation's leadership team – Finance, Procurement, Estates, and Capital Project teams will engage to develop a focussed and active approach to project implementation.	Present a summary of this Decarbonisation Delivery Plan to HDUHB Senior Management.	Carbon Trust / HDUHB Project Team	June 2022
	Continue to engage with the Welsh Government Energy Service to develop and deliver solar photovoltaic projects across the HDUHB region.	Estates & Facilities	March 2023

Existing Buildings

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
4. Progress a transformational energy and water efficiency retrofit programme across the estate – every building with a long-term future will have undergone a feasibility study to identify prospects for a multi-technology energy-efficient upgrade by 2030.	Commission energy and carbon audits to inform the 2024-25 Action Plan.	Estates & Facilities	March 2023
	Consider the opportunity and if viable implement voltage trimming at Witybush, Prince Philip and Glangwili.	Estates & Facilities	By 2025
	Review the opportunity to improve sub-metering across all acute hospital sites - install automatic sub-meters.	Estates & Facilities	By 2025
	Undertake inventory of AHU motors and identify potential upgrades to EC fans for all acute sites.	Estates & Facilities	2022/23
	Review pipework insulation as part of ongoing maintenance across CT circuits in all buildings and upgrade where required.	Estates & Facilities	2022/23 By 2025
	Undertake detailed review of heating zoning across all acute sites and make necessary improvements to optimise heating controls and efficient operation of heating systems.	Estates & Facilities	March 2023 June 2026
	Embark on a single glazed window replacement strategy for long-term assets, especially Prince Philip and Bronglais.	Estates & Facilities	By 2025
	Undertake feasibility and where appropriate increase loft insulation in pitched roof buildings of Bronglais and Glangwili to minimum u-value of 0.16W/m²K.	Estates & Facilities	By 2025
	Undertake surveys to review potential to upgrade dual duct AHU in all acute sites to efficient modern units.	Estates & Facilities	March 2023
	Carry out building fabric surveys, for acute sites that have not had these carried out, and subsequently produce upgrade plans for fabric of all acute sites.	Estates & Facilities	March 2024

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
	Review opportunities to improve efficiencies through infrastructure replacement works (non-energy efficiency works) across the HDUHB built estate.	Estates & Facilities	March 2024
	Explore opportunities to support low carbon heating systems to be installed as replacement for end-of-life fossil fuel plant in all buildings.	Estates & Facilities	June 2026
	Confirm how and when Glangwili and Worthybush Acute General Hospital sites will be 'repurposed' and ensure that retrofit measures, and future Action Plans, take account of this.	Strategic Planning	Subject to Business care timescales
5. Where appropriate replace existing lighting with LED lighting by 2025. (This will be reviewed in line with recent installations and strategic development plans)	Informed by the guidance within this Action Plan, develop a lighting upgrade plan for each acute site - seeking expert advice where required. The upgrade plan will also need to assess existing infrastructure for required upgrades to be carried out simultaneously and revised lux levels where necessary. Advance lighting controls should also form a central part of any lighting upgrade plans.	Estates & Facilities	2022/23
	Procure and implement LED upgrades across all buildings assumed to have a future beyond March 2027 by 2025. Buildings with an uncertain future (after 2027) should be considered on a case-by-case basis and this should not be a barrier to decarbonisation where LED upgrades may still be appropriate.	Estates & Facilities	By 2025
6. Complete expert heat studies by the end of 2023 for all acute hospitals to set the plan to transition away from fossil fuel heat sources.	Undertake specialist low carbon heat evolution plans at all four acute hospital sites to set out a transition plan away from fossil fuelled heat toward low carbon heat. This will include heat generation, heat distribution, heat emitters, and building fabric upgrades. The evolution plans should consider technologies such as heat pumps, biomass, chiller heat recovery, wider heat networks (where realistic) and other innovative heat solutions such as sewage heat recovery and emerging heat pump technology.	Estates & Facilities	March 2024
7. Progress low carbon heat generation for all non-acute sites larger than 1,000m ² by 2030.	Undertake low carbon heat feasibility studies at all nine non-acute sites larger than 1000m ² . Implement changes to target a shift to full low carbon heating by 2030. Aim to have converted five non-acute sites to electric heating by March 2030.	Estates & Facilities	By 2030
8. No further natural gas CHP plant will be installed – renewable CHP will be championed instead. Subject to site energy security, existing CHP plant maybe decommissioned once funds and installation of alternative heat and power allows and this is part of the major refurbishment of infrastructure plans from 2025, with the ambition for all gas CHP to be decommissioned by 2030.	Continue to certify all four CHP plants to the CHPQA programme to ensure efficient operation. Report CHPQA compliance information and CHP maintenance spend through EFPMS when inputs developed.	Estates & Facilities	March 2023
	HDUHB will not install new fossil fuel CHP plant at any sites.	Estates & Facilities	
	Assess age and condition of the four current CHP plants for planned decommissioning and identify impact of early retirement where possible - this will include both financial and carbon considerations. It should be noted that the Current Energy Performance Contract ends 2025 and so a replacement for the CHP should be considered before this date.	Estates & Facilities	March 2024
	HDUHB will have an ambition to decommission all CHP by 2030.	Estates & Facilities	March 2030
9. Take an active approach to efficient control of energy in our buildings. All buildings will move towards up-to-date, standardised, and effective building management systems (BMS). HDUHB Decarbonisation PMO will champion adoption of energy by BMS control by 2024.	BMS upgrades are required at all 4 acute hospital sites and should be implemented once funding can be secured. Prince Philip is a long-term asset and the BMS is now obsolete so should be prioritised. Estate infrastructure should also be considered as part of this work as infrastructure upgrades may be required concurrently for optimal BMS usage.	Estates & Facilities	By 2025

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
10. Determine the overall viable potential for onsite renewable energy generation at each NHS organisation by 2023. Subject to feasibility and resources HDUHB ambition is to Install a significant proportion of this potential in place by 2027, and have majority of energy supply by 2030.	Estates should develop standard operating procedures for each acute site to optimise the efficient operation of buildings; this will include set schedules for timeclocks / operating setpoint / alarms.	Estates & Facilities	March 2023
	Continue to engage with the WGES to develop and deliver solar photovoltaic projects across the HDUHB region.	Estates & Facilities	March 2023
	Continue with planned/ongoing building-mounted and car port renewable energy installations. - Roof mounted PV and Solar car ports at PPH. To install 54.4KWp of roof mounted PV and 120KWp of solar carports. - To install 120KWp Roof mounted PV at BGH. - Roof mounted PV at WGH. To install 177.9kWp roof mounted solar PV array on hospital residential blocks, 52.8kWp on Maintenance block and 92.8kWp on the Puffin roof on the WGH site.	Estates & Facilities	Individual project timescales
	Develop a strategy to ensure existing renewable energy systems remain well maintained (e.g., periodic cleaning schedule, schedule of consumable part replacement (e.g. inverters) in line with expected lifespans).	Estates & Facilities	March 2023

New Builds and Major Refurbishment

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
11. Develop and build low carbon buildings to net zero standard – engage and collaborate with NHS partners across the UK on the emerging net zero building standard for hospitals, and adopt a net zero building accreditation approach which will be defined by 2022.	Ensure any new buildings, e.g., Cross Hands, will be BREEAM 'Excellent' with refurbishments achieving 'Very Good'.	Estates & Facilities	On going
	Any future new builds (including new acute hospital) will be certified to the relevant adopted net zero standard.	Estates & Facilities	On going
	Embodied carbon will be calculated and presented for new builds and major refurbishments (e.g., BS 15978, CIBSE TM65)	Estates & Facilities	On going
12. All project teams to have an independent client-side sustainability representative to provide due diligence support for the optimal low carbon design across all development stages – and be responsible for ensuring the Net Zero Framework process is followed.	Ensure that suitable qualified client-side sustainability representatives are in place for all new build projects. The sustainability representative will be responsible for championing flexibility in the design to ensure that new and emerging low carbon technologies can be added at later stages of the design process.	Estates & Facilities/Planning	On going
13. Integrate Modern Methods of Construction (MMC) into the design and construction of new buildings – this will consider modular design, offsite fabrication, and just-in-time delivery to minimise construction-related carbon emissions.	HDUHB will work with the design teams for all new build and major refurbishment developments to consider the use of Modern Methods of Construction (MMC) and modular designs principles. Design teams will have to provide compelling reasons if MMC are not considered or state why they are not appropriate.	Estates & Facilities	On going

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
14. Install electric vehicle charging points in new developments beyond minimum requirements, and future-proof new car parks by installing infrastructure to enable straightforward installation of future charging points.	The Health Board will carry out electric Authorised Service Capacity reports for all new build and major refurbishments to assess additional EV charging capacity at each site.	Transport & Sustainable Travel	March 2022
	Explore the opportunity to support with all new car parks will have appropriate EV charging infrastructure installed to enable future connections and charging unit installs.	Estates & Facilities/Transport & Sustainable Travel	By 2025
	Current EV charging infrastructure is a barrier to significant EV deployment. Engage with NWSSP to establish best practice approach to EV uptake (see Transport section and Initiative 17 of NHW Wales Decarbonisation Strategic Delivery Plan 2021-2030).	Transport & Sustainable Travel	September 2022
	Explore the option to to install rapid charge points as EV infrastructure progresses across all sites.	Estates & Facilities/Transport & Sustainable Travel M	By2030
15. Prioritise low carbon heating solutions as a key design principle. No fossil fuel combustion systems are to be installed as the primary heat source.	Ensure all new or refurbished sites utilise low temperature heating systems with variable flow temperatures and a low carbon heat source. No new natural gas, oil or LPG boilers will be installed as a primary heat source going forward beyond those which are currently planned - fossil fuels may only be used as backup energy sources.	Estates & Facilities	March 2026
16. Incorporate the principles of sustainable transportation into the design of new sites (in addition to electric vehicle infrastructure) in line with the Welsh Government's Active Travel Action Plan for Wales.	Continue to work with local public transport providers to ensure new sites have suitable public transport options. Ensure all four acute hospital sites have a fully up to date and maintained active travel maps. Incorporate cycling facilities to enable secure storage and shower/ locker facilities.	Strategic Planning/Transport & Sustainable Travel	By2030

Transport

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
17. NWSSP will work with Health Boards and Trusts to develop the best practice approach for EV charging technology, procurement, and car park space planning – this will include consideration of NHS Wales's own fleet, staff vehicles, and visitor EV charging.	As per the recommendations of the recently completed third-party review of electrical infrastructure and EV charging opportunities across the estate, commence implementation of an initial 140 charging bays across 10 sites.	Estates & Facilities / Transport & Sustainable Travel	By2025
	Engage with NWSSP to implement further EV charging rollout at the scale and pace to match demand, which will be specified in the best practice approach.	Estates & Facilities Transport & Sustainable Travel	March 2026
	Participate in Riversimple Hydrogen car pilot scheme and assess its outcomes.	Transport & Sustainable Travel	March 2023
18. A standardised system of vehicle management for owned and leased vehicles will be developed to plan, manage, and assess vehicle performance – this will entail central fleet management oversight within each organisation.	Develop a HDUHB fleet baseline assessment to consider vehicle types / CO2 emissions / age / efficiency / fuel types etc. Ensure arrangements are in place for an annual review of the fleet.	Transport & Sustainable Travel	September 2022
	Expand telematics tracking system to all core fleet following approval of currently pending business. Continue to implement rollout of telematics across all HDUHB vehicles.	Transport & Sustainable Travel	September 2022
	BEVs will be the default for all new vehicles up to 3.1t (except emergency response).	Transport & Sustainable Travel	September 2022
	Ensure Knowles Fleet have a mechanism in place to challenge vehicle requests that do not comply with EV / ULEV requirements.	Transport & Sustainable Travel	September 2022
	A further £200k EFAB pre-committed allocation is to be spent on electric vehicles in FY 22/23.	Estates & Facilities/Transport &	July 2022

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
<p>Initiative 19: All new cars and light goods fleet vehicles procured after April 2023 will be battery-electric or hybrid wherever practically possible. In justifiable instances where this is not suitable, ultra-low emission vehicles should be procured.</p> <p>20. All new medium and large freight vehicles procured after April 2025 will meet the future modern standard of ultra-low emission vehicles in their class.</p>		<i>Sustainable Travel</i> (subject to consultation and confirmation)	
	Develop an approach to decarbonise fleet emissions, including: Vehicle management systems to consolidate journeys / Technologies such as low energy tyres and aerodynamic improvements / Exploring localised opportunities for alternative fuels (e.g. biodiesel / hydrogen).	<i>Transport & Sustainable Travel</i>	March 2024
<p>21. HDUHB will appraise the use of staff vehicles for business travel alongside existing pool cars and will update business travel policies to prioritise the use of electric or hybrid pool cars, electric private vehicles and public transport.</p>	Consider incentives / disincentives to encourage staff to transition from ICE vehicles to ULEV / EVs. Identify the limitations / barriers to incentivisation that exist within the A4C terms and conditions or Equality legislation.	<i>Transport & Sustainable Travel</i>	September 2023
	Publish a HDUHB sustainable travel hierarchy.	<i>Transport & Sustainable Travel</i>	May-2023
	Increase awareness amongst staff, at all levels within HDUHB, of EVs and their benefits, develop soft touch approaches to encourage migration of staff vehicles over to EVs.	<i>Transport & Sustainable Travel</i>	June 2022
	Develop a staff travel survey to establish staff travel routines to help reduce the 68% of transport emissions associated with staff commuting. Ensure surveys are standardised and repeatable so they can be undertaken on an annual basis.	<i>Transport & Sustainable Travel</i>	October 2023
	Develop and implement a new process for the collection of patient travel data. Ensure surveys are undertaken on an annual basis.	<i>Transport & Sustainable Travel</i>	October 2022
	Develop a transport monitoring scorecard and agree a mechanism for ongoing reporting. To include: - Business mileage / CO ₂ - Fleet mileage / CO ₂ - Staff commute mileage / CO ₂ - Patient & Visitor Travel mileage / CO ₂ - Fuel costs / reimbursements - VC / MS Teams utilisation - Home working metrics	<i>Transport & Sustainable Travel</i>	May 2022
<p>Initiatives 22, 23 and 24²</p> <p>¹ Initiatives 22, 23 and 24 relate to Welsh Ambulance Services NHS Trust (WAST) activities. These initiatives fall under the responsibility of WAST, as</p>			

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
detailed in the NHS Wales DSDP, and so are not considered within the scope of this delivery plan.			

Procurement

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
25. NWSSP will transition to a market-based approach for supply chain emissions accounting.	Conduct a review of medical gas and inhaler procurement to better understand the supplier emissions breakdown.	Procurement	By 2025
	Develop a template for approaching HDUHB's top 100 suppliers (by value) to establish product-specific carbon emission information. This data should be collected annually.	Procurement	March 2023
	Share the key findings from the initial engagement with these top 100 suppliers across the Health Board and with NWSSP teams (including Transformational Procurement Team).	Procurement	May 2023
	Establish a system for engaging with the top 100 suppliers periodically (e.g., two-yearly) to undertake due diligence on supplier carbon emissions calculations.	Procurement	May 2023
	Incorporate Welsh Government Policy Procurement Notes 06/21 and 12/21 into tender processes. With the support of NWSSP, continue developing a template for tenders that incorporates decarbonisation.	Procurement	March 2023
	HDUHB will take advice from NWSSP on updated carbon footprint methodology and the need to collect market-based carbon emission data. It will also engage with the forthcoming Welsh Government procurement workstream.	Procurement	March 2023
26. NWSSP will expand its current Sustainable Procurement Code of Practice to include a framework for assessing the sustainability credentials of suppliers.	HDUHB Procurement to respond as required to outcome of NWSSP Procurement actions.	Procurement	TBC
27. Value to the local supply chain will be maximised, whilst maintaining high standards for goods and services.	HDUHB Procurement to respond as required to outcome of NWSSP Procurement actions.	Procurement	TBC
28. 100% REGO-backed electricity will be procured by 2025, and 100% offset gas by 2030.	HDUHB will continue to work with appropriate teams across NHS Wales to maintain 100% REGO backed electricity supply.	Procurement	TBC
29. NWSSP Procurement Services will embed NHS Wales's decarbonisation ambitions in procurement procedures by mandating suppliers to decarbonise.	HDUHB Procurement to respond as required to outcome of NWSSP Procurement actions.	Procurement	TBC
30. Sustainability will be embedded within strategic governance – NWSSP Procurement Services will work across Wales to champion decarbonisation in the supply chain, and influence decarbonisation TBC ambitions for buildings and transport.	HDUHB Procurement to respond as required to outcome of NWSSP Procurement actions.	Procurement	TBC

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
31. NWSSP Procurement Services will improve supply chain logistics and distribution to reduce the carbon emissions from associated transport.	HDUHB Procurement to respond as required to outcome of NWSSP Procurement actions.	Procurement	TBC
32. NWSSP Procurement Services will actively develop and support procurement requirements to support implementation of this Strategic Delivery Plan.	HDUHB Procurement to respond as required to outcome of NWSSP Procurement actions.	Procurement	TBC

Estate Planning and Land Use

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
33. <i>The Health Board strategic estate planning will have carbon efficiency as a core principle – quantified carbon will be a key decision metric for planning new developments, rationalisation of the estate, and championing smart ways of working.</i>	Continue work with WGES and the Bronglais Public Sector Group to look at large scale low carbon feasibility for Bronglais Hospital, Aberystwyth University and surrounding industrial areas, including potential Aberystwyth Heat Network. HDUHB will also use the net zero framework when considering wider estate planning.	Decarbonisation Task and Finish Group/ Estates & Facilities	Ongoing
	Ensure rationalisation of the estate where possible to reduce emissions by implementing the HDUHB estate strategy. Recent example: HDUHB has leased a new building to house HR team members so that the Glangwili site can be freed up for clinical services.	Ianni Estates & Facilities/Strategic Planning	By2025
34. HDUHB will work closely with NWSSP and Welsh Government on an appraisal approach for allocating land for uses such as renewable energy generation, greenhouse gas removal and afforestation and to maintain green space and utilise land for decarbonisation, including collaborating with neighbouring landowners.	HDUHB will adopt guidance for carbon accounting of existing land and identifying suitable land for renewable energy generation and greenhouse gas removals, once provided by NWSSP and Welsh Government.	Estates & Facilities	March 2023
	HDUHB will undertake a land evaluation to establish areas of the existing estate for potential renewable energy generation or greenhouse gas removal. Assessments will factor in location, existing land use, planned future land use, proximity to NHS sites and private wire opportunities.	Estates & Facilities /Energy Services	March 2023
	HDUHB will set up a working group to support localised initiatives to maintain green spaces on hospital sites for use by staff, the public and patients. Additionally, HDUHB will consider land use change and biodiversity enhancement projects as these will contribute to the overall carbon reduction targets. This will be done in line with their public sector biodiversity duty.	Decarbonisation Task and Finish Group/PMO	Ongoing
	HDUHB will continue to work with WGES, and further commissions as needed, to support the development of large scale renewables at Glangwili and Withybush hospitals.	Decarbonisation Task and Finish Group / Estates & Facilities	By2025
35. HDUHB will work with NHS Wales and Welsh Government as well as strategic partners to explore and progress large scale renewable generation with private wire connection to our sites.	HDUHB will commission feasibility assessments for large-scale renewables including solar PV and wind generation.	/Energy Services/Estates & Facilities	March 2023
	HDUHB will continue to engage with the Welsh Government Energy Service to develop and deliver solar photovoltaic projects. Continue with planned/ongoing large scale renewable energy installations;	Estates & Facilities	Individual Project timescales
	<ul style="list-style-type: none"> - Hafan Derwen. 0.5MW Solar farm. - Roof mounted PV and Solar car ports at PPH. To install 54.4KWp of roof mounted PV and 120KWp of solar carports. - To install 120KWp Roof mounted PV at BGH. - Roof mounted PV at WGH. To install 177.9kWp roof mounted solar PV array on hospital residential blocks, 52.8kWp on Maintenance block and 92.8kWp on the Puffin roof on the WGH site. 		

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
	HDUHB will develop a strategy to ensure existing renewable energy systems remain well maintained (e.g., periodic cleaning schedule, schedule of consumable part replacement (e.g. inverters) in line with expected lifespans).	<i>Estates & Facilities /Energy Services</i>	On Going

Approach to Healthcare

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
36. Our approach to 21st-century healthcare will be central to the design of new hospital developments – redesigning the whole journey with care closer to home in a carbon-friendly primary care estate with a reduced need to visit hospitals.	‘Use a OH approach to collaborate with human, animal and environmental health disciplines within the decarbonisation agenda to maintain a wider perspective on the Wider Determinants of Health across Health and Social Care; use Theme 2 of OH to focus specifically on the decarbonisation initiative(s). Use OH principles to link up the complex factors to help find a solution in tackling issues linked to sustainable changes and decarbonisation’	<i>One Health / PHW</i>	By 2025
37. HDUHB will support the Welsh Government’s target for 30% of the Welsh workforce to work remotely, by continuing to facilitate flexible and smart working, developing the existing approach to remote working technology, and rationalising existing office space.	Establish a working group to review the proportion of the workforce that could feasibly work remotely e.g., office-based staff, and actively encourage staff to work remotely where this can be feasibly achieved.	<i>Organisation and Workforce Development / Estates & Facilities Strategic Planning/IM&T</i>	March 2023
	Develop and implement a hot desk policy for acute and community sites.	<i>Organisation and Workforce Development Estates & Facilities Strategic Planning/IM&T</i>	March 2023
	Following the assessment currently being undertaken by a third-party contractor (report due April 2022), review the possibilities to transform office space into additional healthcare facilities.	<i>Estates & Facilities /OD&W Estates & Facilities Strategic Planning/IM&T</i>	March 2023
	Develop the opportunities to work with external partners to share and utilise office space that have already been identified (e.g., community hub at old Debenhams, Carmarthen) and continue to monitor opportunities throughout the action plan period.	<i>OD&W Estates & Facilities Strategic Planning/IM&T</i>	March 2024
38. HDUHB will continue to utilise technology to increase the efficiency of engagements between staff and the public where suitable.	Maintain the use of digital consultations and patient monitoring where possible to reduce the requirement for avoidable staff and patient travel - where medically appropriate.	<i>Clinical Service/IM&T/Estates & Facilities/Transport</i>	March 2023
	Continue to use technology alongside the 111 service to support patient triage, information gathering, and to signpost patients to appropriate health services. HDUHB will also keep in contact with initiatives at an NHS Wales level and look to implement when available (e.g., NHS Wales app).	<i>Clinical Service/IM&T/Estates & Facilities/Transport</i>	March 2023

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
	Ensure healthcare professionals are provided with the appropriate technology to carry out these tasks effectively.	Clinical Service/IM&T/Estates & Facilities/Transport	On going
	HDUHB will continue to take advice from NHS Wales to the best practice use of digital technology. It will also investigate the possibility of creating a specialist sub-group to create an internal best practice approach to the use of digital technology and digital consultation technology.	Clinical Service/IM&T/Estates & Facilities/Transport	On going
	Continue the process of digitalisation of health records, which has already begun, and will continue throughout the action plan period.	Clinical Service/IM&T/Estates & Facilities/Transport	On going
39. Health education will be used to champion decarbonisation across our service – we will encourage sustainable healthcare practice, waste efficiency, and low carbon staff and patient behaviour.	HDUHB will engage with an internal Carbon Awareness Programme for staff. HDUHB will continue to provide space internally for sustainability working groups. HDUHB will engage with Doctors for Greener Health Care Networks and look to incorporate it at the Health Board level. Establish a Decarbonisation working group to develop a One Health Decarbonisation Delivery and Action plan which contributes to the HDUHB Decarbonisation plans and the Sustainable Development Plans	Decarbonisation Taskforce / One Health	On going
40. We will continue to support the work of existing working groups such as the Welsh Environmental Anaesthetic Network to raise awareness of the carbon impact of medical gases and transition to a culture where gases with low global warming potentials are prioritised.	HDUHB will ensure medical gas capture technology is integral to all new builds and major refurbishments.	Estates & Facilities	By 2025
41. We will continue to explore methods of minimising gas wastage and technologies to capture expelled medical gases.	HDUHB will ensure medical gas capture technology is utilised	Decarbonisation Taskforce	By 2025
42. We will continue to take a patient-centric approach to optimise inhaler use, focusing on a reduction in the over-reliance of reliever inhalers where possible and emphasising the importance of inhaler-specific disposal and recycling.	HDUHB will ensure medical best practice is utilised	Decarbonisation Taskforce	On going
43. We will continue to transition the existing use and distribution of carbon-intensive and high global warming potential (GWP) inhalers to alternative lower GWP inhaler types where deemed suitable.	HDUHB will ensure medical best practice is utilised	Decarbonisation Taskforce	On going
44. We will support the NHS Wales development of pan-Wales guidance by 2023 for best practice reduction of pharmaceutical waste.	HDUHB will work with NWSSP and ensure best practice initiatives for the reduction of pharmaceutical waste are implemented once finalised. HDUHB will also collaborate with other Health Boards and trusts to ensure standardised approach.	NHS shared services/Procurement/Decarbonisation Taskforce	On going
45. We will partner NHS Wales to develop 'plastics in healthcare' initiatives to address waste in the delivery of health care - this will aim to tackle PPE, single use plastics, and packaging waste.	HDUHB will work with NWSSP and ensure best practice initiatives for plastics in healthcare are implemented once finalised.	NHS shared services/Procurement/Clinical Services/Healthcare therapies/IM&T/Estates & Facilities	On going
	HDUHB will consider second life possibilities for non-medical equipment that is no longer required. Reuse elsewhere within the Health Board and donation will be prioritised over creation of waste. This will be incorporated into Health Board policy.	NHS shared services/Procurement/Clinical Services/Healthcare therapies/IM&T/Estates & Facilities	By 2025

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Responsibility	Ambition date
46. HDUHB will engage with pharmacists and prescribers to build upon and support existing efforts to encourage responsible disposal of inhalers through discussions with patients, information leaflets, posters and media.	HDUHB will introduce additional inhaler-specific disposal facilities in hospitals in partnership with industry stakeholders.	NHS shared services/Procurement/Medicines management	On going
	HDUHB will support the work of groups such as the Welsh Respiratory Health Implementation Group and the International Pharmaceutical Aerosol Consortium to emphasise the importance of responsible disposal with regard to carbon emissions.	NHS shared services/Procurement/Medicines management	On going
	HDUHB will encourage pharmacists and prescribers to stress the importance of responsible disposal to their patients, and the fact that even low carbon inhalers need to be disposed of properly. Also make use of the existing RHIG digital app to effectively communicate with patients.	NHS shared services/Procurement/Medicines management	On going

6. Beyond the 2022-2025 DAP

All Health Boards and Trusts are required to develop Decarbonisation ‘Action Plans’, to be regularly updated and committed to within Integrated Medium-Term Plans on a 2 yearly basis. As the first such Action Plan, section 5 sets out the key actions for HDUHB to take between 2022 and 2024. However, with Decarbonisation Action Plans due every two years and the ambition for the public sector in Wales to be Net Zero by 2030, it is important to maintain a longer-term outlook and be aware of actions that may fall outside the scope of this 2-year Action Plan. This not only supports many of the key carbon management and governance actions identified in this report but will also help decarbonisation activities to become embedded within the decision-making processes at all levels of the Health Board and become appropriately incorporated into longer term strategic actions.

An outline of the key actions that are relevant to a 2024-2026 time horizon will assist HDUHB when making decisions on short term actions, but it will also help to inform the next iteration of the Decarbonisation Action Plan, that will be due in March 2024.

6.1. Carbon Management

The three overarching initiatives covered under the Carbon Management section of this report (4.1) represent ongoing actions that HDUHB should undertake in the next two years and beyond. The carbon management actions required for the next decarbonisation action plan period, 2024-2026, will be based on the progress that HDUHB make between 2022 and 2024. Therefore, no specific actions are listed here.

6.2. Buildings

6.2.1. Existing Buildings

The following table details the key actions for HDUHB to undertake between 2024 and 2026 in respect to existing buildings.

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Target date
5. Fully replace all existing lighting with LED lighting by 2025.	Procure and implement LED upgrades across all buildings assumed to have a future beyond March 2027 by 2025.	2025
	Buildings with an uncertain future (after 2027) should be considered on a case-by-case basis as this should not be a barrier to decarbonisation where LED upgrades may still be appropriate.	

7. Progress low carbon heat generation for all non-acute sites larger than 1,000m2 by 2030.	Implement changes to target a shift to full low carbon heating by 2030. Aim to have converted 50% of heat to low carbon heat by 2026 – starting with Prince Philip and Bronglais.	2026 - 2030
8. Determine the overall viable potential for onsite renewable energy generation at each NHS organisation by 2023. Install half of this potential by 2026, and the remainder by 2030.	<p>Following the feasibility study to establish the viability of renewable energy projects at each HDUHB site, conducted as part of this decarbonisation plan, at least 50% of these will be installed by 2026.</p> <p>Structural/infrastructure limitations at Bronglais, Glangwili and Prince Philip may impact future installations. Projects will therefore have to be viewed on a case-by-case basis.</p>	2026

6.2.2. New Builds and Major refurbishments

The decarbonisation actions for new builds and major refurbishments required for the next decarbonisation action plan period, 2024-2026, will be based on the progress that HDUHB make between 2022 and 2024. Therefore, no specific actions are listed here.

6.3. Transport

The following table outlines the transport related actions from the NHS Wales DSDP initiatives that HDUHB will need to undertake between 2024 and 2026.

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Target date
20. All new medium and large freight vehicles procured across NHS Wales after April 2025 will meet the future modern standard of ultra-low emission vehicles in their class.	Procure ultra-low emissions freight vehicles across HDUHB from 2025 – in line with NHS Wales commitments.	2025

6.4. Procurement

Many of the procurement actions from the NHS Wales DSDP are centred at a NWSSP level. Additionally, most actions for 2024-2026 will be dependent on the progress made during the current Action Plan, however, below are actions for HDUHB to consider between 2024-2026.

NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Target Date
28. 100% REGO-backed electricity will be procured by 2025, and 100% offset gas by 2030.	All REGO backed electricity is at national level. HDUHB will continue to work with appropriate teams to maintain 100% REGO backed electricity supply.	2025

6.5. Estate Planning

The decarbonisation actions for Estate Planning required for the next Decarbonisation Action Plan period, 2024-2026, will be based on the progress that HDUHB make between 2022 and 2024. Therefore, no specific actions are listed here.

6.6. Approach to Healthcare

The following table outlines the actions from the NHS Wales DSDP initiatives that HDUHB will need to undertake between 2024 and 2026 in respect to the approach to healthcare.

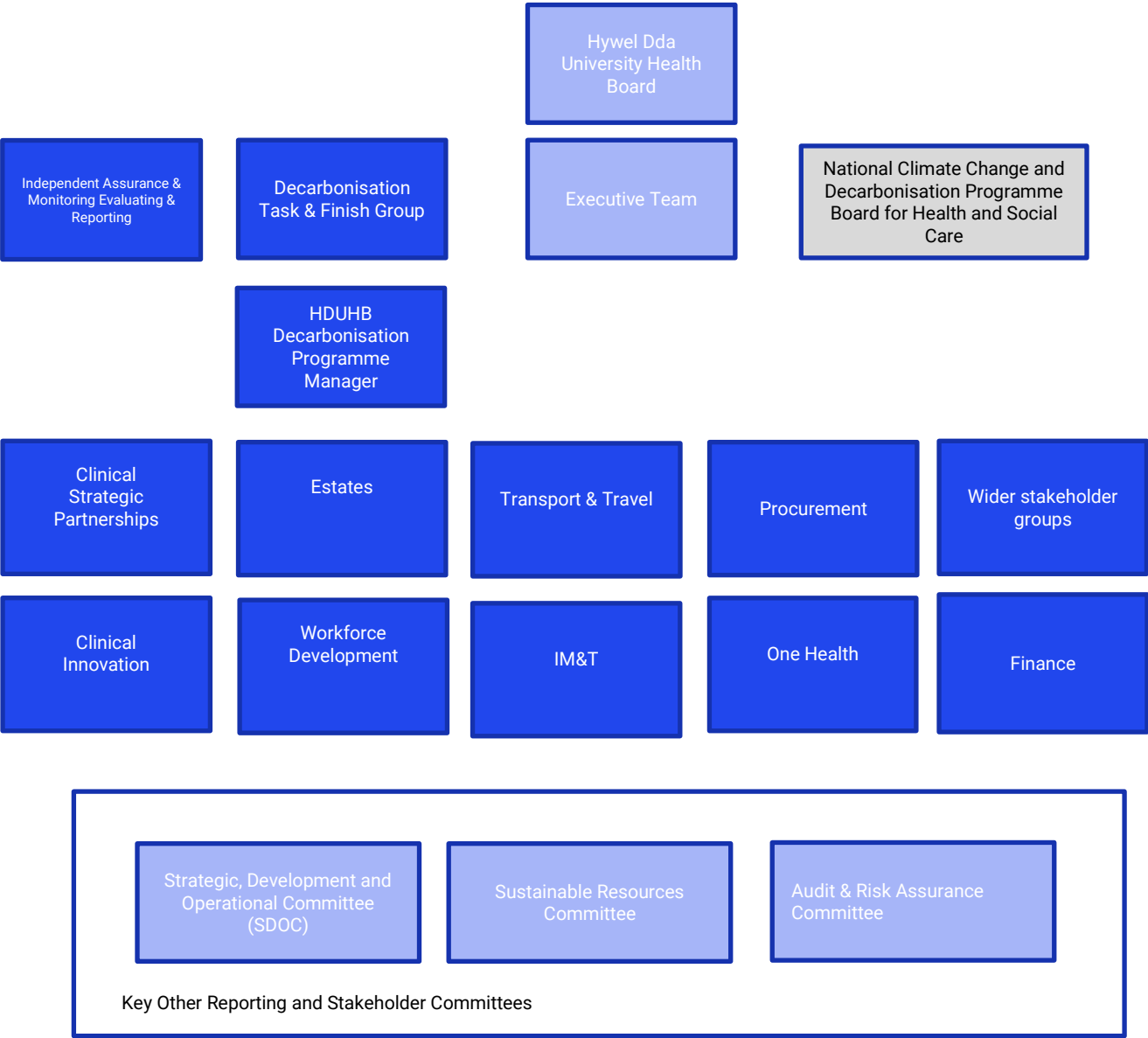
NHS Wales Decarbonisation Strategic Delivery Plan Initiative	HDUHB Actions	Target Date
43. Transition the existing use and distribution of carbon-intensive and high global warming potential (GWP) inhalers to alternative lower GWP inhaler types where deemed suitable.	Target a shift to 80% of inhalers being low GWP alternatives, to put Wales in line with the current European leaders in the field, but only where clinically appropriate and where it is clear patients' stabilisation will not be affected. Deliver through the Welsh Respiratory Health Implementation Group.	2025

7. Implementation Next Steps

7.1. Management Approach

Successful implementation of this Decarbonisation Action Plan will require a step-change in decarbonisation activity across HDUHB.

In recognition of this, a Head of Sustainability, a ‘Decarbonisation Programme Manager’ and a One Health Project Manager will be put in place to drive the implementation of the Decarbonisation Delivery and Action Plans. The Decarbonisation Programme Manager will engage across HDUHB; spanning estates and facilities, planning, transport, procurement, clinical, and wider stakeholder groups, to ensure that the actions within this Decarbonisation Delivery Plan are taken forward and implemented within the stated timeframe. The Decarbonisation Programme Manager and wider management team within HDUHB will be responsible for implementation of this, and subsequent, Decarbonisation Delivery and Action Plan(s). The HB are currently reviewing governance and reporting requirements for decarbonisation delivery and following this the strategy will be updated to reflect ongoing structure



7.2. Funding

It is recognised that access to additional resource and finance is critical to ensure the success of this Decarbonisation Delivery Plan. However, much progress can be made by championing decarbonisation within the decision-making process, and by integrating this into behaviour across HDUHB.

Health Boards cannot access conventional borrowing or private finance, including the Public Works Loan Board. Health Boards are highly reliant on Welsh Government to enable funding mechanisms.

Additional Funding Sources:

Potential Funding	Notes
Discretionary Capital Programme	<p>Subject to infrastructure investment funding business case process. Requiring a Business Justification Case (BJC), or Outline Business Case (OBC) to Welsh Government Health Capital Estates & Facilities.</p> <p>For 2021/22, the Health Board was allocated ~£7.2m, half of which for estates but not specifically for decarbonisation. In 2022/23 however, the allocation is reduced to ~£5.6m.</p> <p>This allocation will be prioritised by HB risk and prioritisation with limited opportunities to address decarbonisation.</p>
Wales Funding Programme – Invest to Save	<p>The Wales Funding Programme is supported by the Welsh Government Energy Service, with funding applications administered by Salix Finance. Funding is then provided direct from Welsh Government on a repayable basis, with criteria limits on payback and carbon cost effectiveness.</p> <p>The Health Board have actively utilised this funding for phases of the multi-site solar PV scheme.</p>
Estates Funding Advisory Board (EFAB) funding – decarbonisation, and infrastructure	<p>£50m of grant funding through EFAB was made available in 2021/22. This was administered through NWSSP, with separate budgetary lots for infrastructure and decarbonisation. The decarbonisation budget for 2021/22 totalled £13m.</p> <p>Unfortunately, no EFAB grant funding is currently available for 2022/23.</p>
Welsh Government Energy Service – Public Sector Fleet Grant	<p>The Welsh Government Energy Service administer funding for fleet vehicle replacements to EVs, and EV charging infrastructure. In 2021/22, a total of £1.5m was made available to the public sector, the availability of grant for 2022/23 is still to be defined.</p>

Welsh Government – Public Sector Low Carbon Heat Grant	<p>The Welsh Government Energy Service and Salix Finance has overseen a pilot ‘Public Sector Low Carbon Heat Grant’ in 2021/21, this totalled £2.4m in value and was largely accessed by Local Authorities.</p> <p>No grant funding is planned for 2022/23, however it is expected that a funding scheme will follow in 2023/24. It is expected that development grant funding will be available in 2022/23 to support project to an investment ready position.</p>
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Hywel Dda UHB Core Funding Allocations:

The All Wales Capital Programme allocation for the Health Board in 2021/22 was £52.6m; this is allocated to estate improvement, infrastructure, and upgrades to deliver healthcare. The revenue spending for the Health Board totalled £1,050m covering all spending on primary healthcare services, hospital and community health, and healthcare from other providers.

The Health Board will utilise available capital and revenue budgets in a smart way, aligned with the climate emergency, in particular this will entail:

- Embedding quantified carbon as be a key decision metric in estates planning – this will be managed through the business case process for revenue and capital spending (Initiative 33).
- Proactive planning of maintenance issues (for instance boiler replacement) so that the low carbon options are understood and utilised (Initiative 7).
- Revenue budget availability should be utilised where possible to support project development.
- Progressing procurement initiatives to influence decarbonisation in the supply chain.

The current All Wales Capital Programme for 2022/23 include schemes such as: diagnostic imaging, fire enforcement works, and phase 2 of the Women and Children development. Alongside this, capital will be used to complete the solar farm which received EFAB funding for 21/22 but did not complete.

The Health Board is facing a significant funding challenge for the estate. With 40% of the estate over 50 years old, existing estates backlog is estimated at £82m. With a limited Discretionary Capital Programme many schemes put forward are unable to progress, including £14m of estate development schemes identified but not prioritised for capital this coming year.

Future Major Schemes:

In 2021 the Health Board submitted a Programme Business Case for ‘*Business Continuity (Major Infrastructure)*’, this sought funding of £87m to be spent over four years at the 4 acute sites.

In January 2022, the Health Board submitted a Programme Business Case for “*A Healthier Mid and West Wales: Our Future Generations Living Well*”. If supported, the business case sets the aim to develop a sustainable service for future generations, explicitly with the goal to maximise carbon efficiency. The business case is seeking approval for a ~£1.35b investment to:

- Construct a new Urgent & Planned Care Hospital,
- Repurpose or rebuild of Withybush and Glangwili General Hospitals,
- Refurbish Bronglais General Hospital and Prince Philip Hospital,
- Develop the community estate in line with our strategic vision.

Funding this Decarbonisation Action Plan:

Funding this Decarbonisation Delivery and Action Plan will require low carbon alignment in how we utilise existing funding for healthcare delivery, procurement, and capital projects. Based on specific additional decarbonisation actions and measures shown, the additional funding required is estimated as:

	Development Funding	Investment Funding
Decarbonisation Action Plan period 2022-24	£480,000	£15,420,000

7.3. Implementation Capacity

Implementing the Decarbonisation Action Plan will require additional internal resource and capacity, as well as expert contracted support. The capacity challenge can be simply split into two:

Internal resource

It is anticipated that additional resource will be required in the following areas:

- Decarbonisation Project Manager to act a central fully resourced focal point for activity
- Estates support for project development and delivery – covering buildings and transport
- Procurement team support, both to develop the supply chain engagement initiatives, and also support wider delivery

Engagement across the health board will be required, and adjustments made to existing practice. This will require education and enabling of key staff groups, in particular for the approach to health care, waste, and employee commuting related initiatives.

External Resource

Utilising will be required for both project development, and supply & install contractors for implementation. In particular:

- Utilising heat and renewable power experts for understanding the opportunity on the estate and creating specific implementation plans
- Utilising planning, procurement, legal support in project development
- Design team experts (e.g. architects / M&E engineers) to follow low carbon and net zero aligned standards in the design of major capital schemes
- Collaboration with the NWSSP for procurement initiative implementation
- Collaboration with the Welsh Government Energy Service to support implementation
- Collaboration with the Regional Partnership Board and public sector partners for joint learnings
- Collaborate with stakeholder groups and wider industry to further develop low carbon health care practice

8. Key Next Steps

Mobilisation activities

- Utilise the Decarbonisation Delivery and Action Plans into the existing Decarbonisation Task Force
- Review resource requirements, in particular, put in place a central Project Manager role as a focal point for activity
- Launch the Decarbonisation Action Plan and build responsibility for delivery across the organisation – assigning specific projects as required
- The Decarbonisation Action Plan should be a live working document – seek feedback through engagement, and update as actions projects

Key development actions

- Refine the short-term energy efficiency measures for delivery – in particular those identified in survey work
- Undertake expert heat and renewable power studies – utilising existing relationships, the wider supply chain, and the Energy Service
- In collaboration with NWSSP, engage further with the supply chain to gather sustainability credentials and available carbon data. Plan and target upcoming procurements for increased low carbon assessment (as appropriate).
- Update policy and practice – in particular with regard to commissioning and procurement
- Engage across the organisation to build profile and support for activity – in particular waste and the approach to health care

Key projects to implement

- Implement the Hafan Derwen solar farm and community site roof mount and car park canopy solar PV projects
- Align fabric improvements and low carbon upgrades into delivery of the '*Business Continuity (Major Infrastructure)*' capital scheme
- Implement heat pumps at target sites, in particular, in place of end of life boiler replacements
- Deliver EV charging and electric vehicles into the fleet

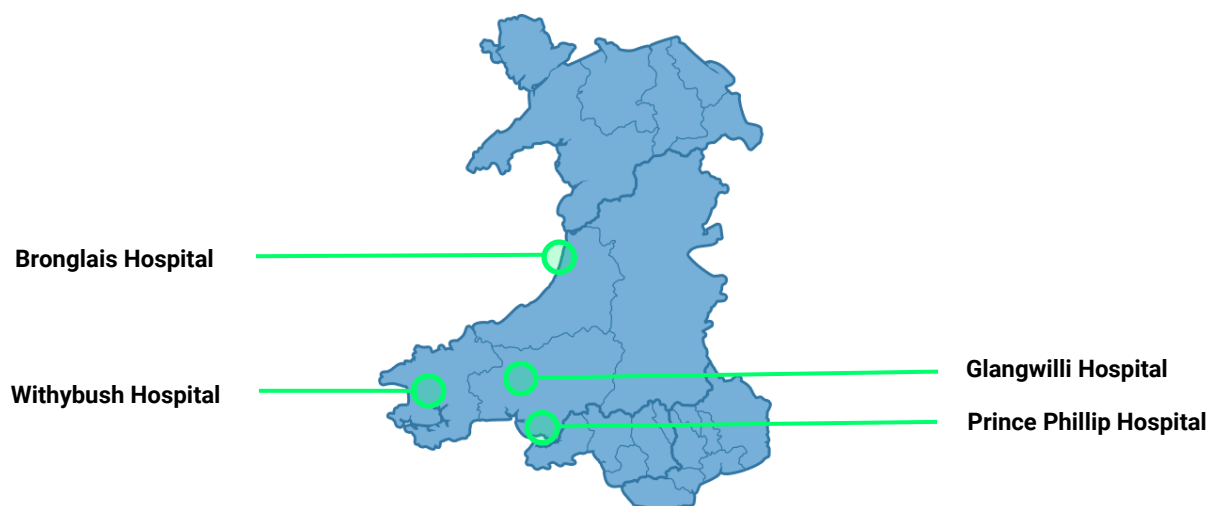
Making change happen

- Creating sustained momentum with a strong governance structure and clear communication across the organisation.
- Deliver success by accessing additional funding streams, and working with Welsh Government to support the following anticipated additional costs for implementing this Delivery plan:

9. Appendices

Appendix 1: Summary of site audit findings

Site audits were conducted across the Health Board's four acute sites, which combined account for approximately 86% of HDUHB's Scope 1 and 2 emissions.



1.1. Approach and general findings

A 1-day energy audit including site inspection and engagement with the estates team and energy managers was conducted at each site to identify priority decarbonisation initiatives. The primary focus of the audits was on reducing electrical and on-site fossil fuel consumption, spanning energy efficiency measures, energy governance improvements and building fabric and insulation improvements. A separate low carbon heat evolution plan at each acute site should complement this work to set out a transition plan away from fossil-fuelled heat toward low-carbon heat (Initiative 6, NHS Wales Decarbonisation Strategic Delivery Plan).

All major plant equipment was surveyed as part of the audit. Due to COVID-19 and other contamination risks, the audit was restricted to communal areas and access to clinical and patient areas was prohibited. Where suitable and with input from the energy team, findings from available areas have been extrapolated to provide site-wide estimates. The energy and cost saving potential of the sites presented should only be used as a high-level guide, and multiple quotes from suitably qualified suppliers/installers should be sought for any detailed business case preparation.

The measures set out in this Plan (Appendix 2) should be priority objectives for the Health Board to implement prior to 2025. The audits confirmed previous benchmarking exercise that the energy performance of a large proportion of the acute sites is poor and there are significant energy saving opportunities across all acute sites. In many cases, the identified initiatives can be considered as 'low-hanging fruit' that are pre-requisite for deep decarbonisation and the transition away from fossil-fuel heating.

The existing building and energy infrastructure is not compatible with Welsh Public Sector carbon targets and far-reaching changes will be required to ensure alignment. However, it should be recognised that many areas of the acute sites are legacy assets that are either at or approaching end-of-life and require comprehensive repair, refurbishment, or replacement. Energy performance is one of many considerations

for the Health Board and, with limited resource, ensuring functionally suitability and statutory compliance is rightly a priority. Significant resource will have to be made available for the Health Board to achieve the required step-change in energy performance. Multi-year and multi-million-pound investment is ultimately required for the Health Board to align with the Public Sector net-zero target.

The scale of the challenge should not be underestimated and comprehensive buy-in, both within the Health Board and across the broader Public Sector, will be required for Hywel Dda to decarbonise their estate. That said, many of the initiatives outlined can be readily implemented and are proven technologies with attractive financial cases. In many cases, previous building surveys have highlighted similar, or the same, opportunities presented in this report. Robust governance structures should be put in place to ensure that recommendations made in this Plan are realised and Hywel Dda gains momentum on the journey to becoming a Net Zero Health Board.

1.2. Site specific profile and findings

1.2.1. Bronglais

Age	1965 +	DEC rating	E
Floor area	27,531	Heating fuel	Natural Gas
Projects identified	Pipework thermal insulation improvements / LED Lighting upgrades / Heating zone improvements / Ventilation system improvements / Building fabric and insulation improvements / Replacement to high efficiency motors / BMS improvements / Automatic sub-metering		
General findings	Controls	<p>General findings</p> <p>The site is controlled from 2 separate BMS platforms. An old TACS system controls the entire HVAC systems across the site and a newer Schneider platform controls the new build block 15. The existing TACS system is outdated and is recommended to be changed over, re-commissioned and updated to the Schneider BMS system.</p> <p>There is a lack of zonal heating controls in blocks 1 & 2 and it is currently heated using a single pipe heating circuit, despite the blocks having several floors and a north and south side. A survey should be performed to assess the potential for 2 port valves on each floor and each side of the block.</p>	
	Lighting	<p>The site is illuminated from a variety of light sources: approx. 60% T5 Fluorescent, 35% T8 Fluorescent (switch start) and 5% LED. . Existing lighting is predominately manually switched although some areas such as corridors do have occupancy control. However, no spaces have daylight control despite excellent daylight levels in some areas.</p>	

		It is suggested that all lighting is surveyed and subsequently updated to 100% LED with automatic occupancy and daylight controls.
	Fabric	The buildings were largely constructed in the 1960's and 1970's with smaller blocks being Victorian town houses and converted. Poor insulation levels are indicative of the age of the buildings and several blocks would benefit from improvements (e.g., roof insulation, double glazing). Further investigations are required to determine if cavity walls are insulated and the exact nature of fabric improvements across the site.
	Heating	<p>Heating to the main site is provided by a combination of steam boilers (~4.7 MW), CHP (210 kWe), LPHW boilers (~6 MW). 2 LPHW boilers serve the accommodation block and decentralised gas boilers exist in smaller blocks.</p> <p>Current control systems prohibit an efficient centralised heating regime and overheating is prevalent in south-facing blocks with solar gain. The CHP was observed to dump heat as a result leading to inefficient operation.</p> <p>A detailed low-carbon heat evolution plan should be performed to plan the transition away from fossil-fuelled heating.</p> <p>Thermal insulation in newer plant rooms is good, however there are several sections of exposed steam pipework, valves, and traps in older plant rooms. These should be surveyed and insulation subsequently insulated.</p>
	Air handling	Several air handling units do not have heat recovery and the provision of run around coils should be investigated. Further, not all air handling units are provided with variable speed drives which should also be explored.
	MM&T	Metering is poor across the site with limited visibility of energy consumption. Metering, monitoring, and targeting (MM&T) should be instilled at major load centres to enable detailed analysis.
	Motors and drives	A significant end user of energy across the site is from motors and drivers (e.g., lifts, circulation pumps, compressors, AHUs). Standard efficiency motors (IE1, IE2) were present across the site and a programme of replacement to high efficiency IE4 or IE5 motors should commence. A review of all AHUs and the potential for electronically commutated (EC) motors and fans should also be conducted.

1.2.2. Withybush

Age	1970+	DEC rating	D
Floor area	39,477	Heating fuel	Natural Gas / Gas Oil
Projects identified	Pipework thermal insulation improvements / Steam review and rationalisation / LED Lighting upgrades / Heating zone improvements / Voltage trim / Building fabric and insulation improvements / Replacement to high efficiency motors / BMS improvements / Automatic sub-metering		
General findings	Controls	Most heating control valves in the main hospital building are original and complete replacement is required. Additional controls (e.g., 2 port valves and variable speed pumping) should be retrofitting on the original system to further enhance controls. The BMS system is aging and requires updating in parallel to repair of zone controls.	
	Fabric	Majority of the site is concrete floor with concrete structure and concrete flat roof. Walls are internal blockwork with an uninsulated air gap and external concrete panel fixed to the inner block. Insulation that does exist is reported to be old and 'thin'. Single glazing still exists across some areas of the site. Opportunities for fabric upgrades (e.g., roof insulation across the site, upgrades to single glazing, wall insulation with external clad insulation panels) were identified and further surveys are recommended to establish the exact nature of fabric improvements.	
	Heating	Central heating plant includes 3 steam boilers, a 600 kWe CHP and 1 LPHW boiler. There are a small number of decentralised boilers serving smaller areas around the site. Overheating prevalent in many areas of the site due to lack of controls. Insulation of steam and LPHW pipework within older plant rooms is poor leading to excessive heat losses and contributing further to overheating. A detailed low-carbon heat evolution plan should be performed to plan the transition away from fossil-fuelled heating.	
	Steam	Large pressure drop over the site with steam being generated at 10 bar but used at 2 bar. Steam loads are becoming inefficient to service and would benefit from additional surveys with a view to de-steam. In many cases steam is being used where LPHW could be better used (i.e., domestic hot water, air handling units). Steam for some specialised uses (e.g., autoclave, humidification) may still be required.	
	Lighting	The site is illuminated from a variety of light sources: approx. 90% T5 Fluorescent (automatically controlled), 8% T8	

		Fluorescent (switch start) and 2% LED. However, no spaces have daylight control despite excellent daylight levels in some areas. External car park lighting is via sodium discharge lights. It is suggested that all lighting is surveyed and subsequently updated to 100% LED with automatic occupancy and daylight controls.
	MM&T	Metering is poor across the site with limited visibility of energy consumption. MM&T should be instilled at major load centres to enable detailed analysis.
	Motors and driver	A significant end user of energy across the site is from motors and drivers (e.g., lifts, circulation pumps, compressors, AHUs). Standard efficiency motors (IE1, IE2) were present across the site and a programme of replacement to high efficiency IE4 or IE5 motors should commence. A review of all AHUs and the potential for EC motors and fans should also be conducted.

1.2.3. Glangwilli

Age	1950/60+	DEC rating	F
Floor area	51,294	Heating fuel	Natural Gas / Gas Oil / LPG / Biomass
Projects identified	Pipework thermal insulation improvements / Steam review and rationalisation / LED Lighting upgrades / Heating zone improvements / Voltage trim / Building fabric and insulation improvements / Replacement to high efficiency motors / BMS improvements / Automatic sub-metering		
General findings	Controls	<p>The hospitals LTHW pipework and control valves are approaching 60 years old. It is reported that some 3 port control valves within the hospital building (that provide control zones) no longer operate. The problem is compounded as there are not enough control valves and zones to enable effective heating control. Faulty control valves should be replaced along with additional control valves that reflect the current operations. This may include 2 port valves and new variable speed pumping.</p> <p>The BMS front end is now out of date and a modern replacement platform and front end (including outstations) should be installed. This should include coverage of the several blocks not currently connected.</p>	
	Lighting	<p>The site is illuminated from a variety of light sources: approx. 90% T5 Fluorescent (automatically controlled), 8% CFL/T8 Fluorescent (switch start) and 2% LED. External carpark is approx.. 60% LED.</p>	

		It is suggested that all lighting is surveyed and subsequently updated to 100% LED with automatic occupancy and daylight controls. Car park lighting should have photocell and time switch controls integrated.
	Fabric	The buildings were largely constructed in the 1950/60's with more recent extensions such as the A&E department, Renal Unit and Interview Suite in the 2000/10's. Some of the original building has been successfully overclad, however much of the original site has extremely poor insulation levels leading to excessive heat loss. Opportunities for roof cavity insulation, double glazing, external cladding and solar control on south-facing elevations are plentiful and further surveys are required to establish the exact nature of fabric improvements.
	Heating	<p>Heating to the main site is provided by a combination of gas oil steam boilers (2x 12,500 lbs/hr, 1x 7,000 lbs/hr), a 990 kW biomass boiler, a 600 kWe CHP. There are a further 9 decentralised gas boiler plant rooms across the site.</p> <p>The age of the existing pipework and absence of control prohibits efficient operation, leading to significant overheating (particularly in areas close to the plant) and self-regulation of temperature through opening windows. This is present even in blocks with poor thermal performance and high heat losses.</p> <p>The biomass boiler operates ~60% of the time owing to fuel problems. The exact problem was not clearly understood and should be investigated further to maximise use of the boiler and displace fossil fuel consumption.</p> <p>A detailed low-carbon heat evolution plan should be performed to plan the transition away from fossil-fuelled heating.</p>
	Laundry	<p>Glangwilli operates the centralised laundry for the whole Health Board. General operation in the laundry was sound with a proactive focus on efficient operation. Some compressed air leaks were observed that should be repaired.</p> <p>Plans for a new build are underway and gas-fired dryers are being considered. A design code is required to ensure that any new projects are net-zero aligned and minimise fossil fuel consumption as much as feasibly possible.</p>
	MM&T	Metering is poor across the site with limited visibility of energy consumption. Metering, monitoring, and targeting (MM&T) should be instilled at major load centres to enable detailed analysis.
	Motors and drives	A significant end user of energy across the site is from motors and drivers (e.g., lifts, circulation pumps, compressors, AHUs). Standard efficiency motors (IE1, IE2) were present across the site and a programme of replacement to high efficiency IE4 or

		IE5 motors should commence. A review of all AHUs and the potential for electronically commutated (EC) motors and fans should also be conducted.
	Steam	<p>A detailed review and study should be conducted to assess the rationalisation of steam and displace steam in non-essential areas where LPHW could be utilised (e.g., kitchen, AHU, and heating).</p> <p>Several examples of uninsulated steam pipework were observed. All plant rooms and distribution pipework should be surveyed with insulation subsequently insulated.</p>

1.2.4. Prince Phillip

Age	1985+	DEC rating	F
Floor area	29,297	Heating fuel	Natural Gas
Projects identified	Pipework thermal insulation improvements / Steam review and rationalisation / LED Lighting upgrades / Heating zone improvements / Voltage trim / Building fabric and insulation improvements / Replacement to high efficiency motors / BMS improvements / Automatic sub-metering / Replace dual air duct system		
General findings	Controls	<p>The hospital's Johnson Controls platform is life expired and failed in several areas, particularly for the dual duct AC systems. Current controls do not enable heating control of individual wards that results in overheating. In addition, the scope of the BMS system does not include outlying blocks. All faulty control valves and actuators should be replaced with electrical equivalents along with additional control valves that reflect the current operations. This may include 2 port valves and new variable speed pumping for individual ward control.</p> <p>A modern platform and front end should replace the existing BMS system, which should include coverage of the blocks not currently connected.</p>	
	Lighting	<p>The site is illuminated from a variety of light sources: approx. 85% T5 Fluorescent (automatically controlled) and 15% CFL/T8 Fluorescent (switch start). External carpark lighting is reported at 100% LED.</p> <p>It is suggested that all lighting is surveyed and subsequently updated to 100% LED with automatic occupancy and daylight controls.</p>	
	Fabric	<p>The main template hospital building was constructed in 1985's with more recent extensions in 1989 (residential</p>	

		<p>blocks), and mental health block in 2005. Most of the site is concrete floor of brick/block structure and pitched roofs forming plant distribution zones.</p> <p>Walls are internal blockwork with air gap (un-insulated) with an external brick work with the opportunity for cavity filling. Most glazing on the site is single glazed and causes air infiltration losses.</p> <p>Unoccupied void spaces between internal ceilings and external roofs were observed to be a comfortable temperature and heated. Rockwool insulation should be installed above all rigid plasterboard ceilings and insulation 'bags' should be added above all suspended ceilings.</p>
	Heating	<p>Heating to the main site is provided by a combination of steam boilers and a 600 kWe CHP. One further LPHW was present but not operational. There are 5 smaller decentralised boiler rooms across the site and 22 combi boilers serving smaller areas.</p> <p>The absence of functioning controls and zonal heating prohibits efficient operation leading to overheating and excessive fuel consumption.</p> <p>Insulation of steam and LPHW pipework within older plant rooms is poor leading to excessive heat losses and contributing further to overheating. Several LTHW plate heat exchangers were also uninsulated. A survey should be conducted and all exposed surfaces subsequently insulated.</p> <p>A decarbonised heat plan should be developed to consider where heat pumps could be installed across the site. This Plan should recognise some early adopter buildings (e.g., flats and residences) and blocks where gas-fuelled boilers are becoming life expired. A high-temperature central solution should be considered for the main hospital site.</p>
	Air handling	<p>The hospital operates dual-duct air conditioning units and ventilation systems, which is now an obsolete design and a very rare installation in a hospital. The hospitals system is life expired and does not function efficiently.</p> <p>A feasibility study should be conducted to assess if the existing air handling systems can be replaced with a modern low energy solution whilst re-using some of the existing ductwork (so to minimise disruption).</p>
	MM&T	<p>Metering is poor across the site with limited visibility of energy consumption. Metering, monitoring, and targeting (MM&T) should be instilled at major load centres to enable detailed analysis.</p>

	Motors and drives	A significant end user of energy across the site is from motors and drives (e.g., lifts, circulation pumps, compressors, AHUs). Standard efficiency motors (IE1, IE2) were present across the site and a programme of replacement to high efficiency IE4 or IE5 motors should commence. A review of all AHUs and the potential for electronically commutated (EC) motors and fans should also be conducted.
	Steam	A detailed review and study should be conducted to assess the rationalisation of steam and displace steam in non-essential areas where LPHW could be utilised (e.g., kitchen, AHU, and heating).

Appendix 2: Quantified decarbonisation actions

Following the energy audits at the four acute hospital sites (Bronglais, Withybush, Glangwilli and Prince Philip), a number of actions were identified for HDUHB to undertake. These actions can improve the energy efficiency of the sites and contribute to carbon dioxide emission reductions for the Health Board. Where possible, some of these actions have been quantified and financial modelling has been undertaken. Calculations have been based on the FY19/20 consumption data but with the most recent energy unit prices to increase accuracy of the financial savings, as FY19/20 energy prices are now obsolete. The current volatility seen in energy prices in 2021 and 2022 are not reflected in these figures.

It is important to note that the figures presented here are based on high level energy audits for the four acute sites. The financial and carbon estimates outlined in this report are based on the stated assumptions and the data provided to the Carbon Trust as part of the agreed work. The figures outlined in this report are, therefore, representative only and any detailed analysis of cost, energy and emissions savings from the carbon reduction opportunities should be conducted by a suitably qualified professional following detailed site specific assessments and calculations.

1.3. Bronglais

1.3.1. LED Lighting Upgrades

A high level visual inspection of the current lighting at Bronglais was undertaken during the site visit. From the site audit, and information provided by HDUHB, it was assumed that 60% of the current light fitting are using T5 bulbs, with 35% using T8 and the remaining 5% with LED bulbs. The calculations have been based on the total floor area of 27,068m² and the assumption that all the lighting is operational for 24 hours a day. Costings do not account for infrastructure upgrades that may be required as part of the works.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
T5 Bulbs to LED	71,321	65.6	283,759	71,321	227,371	3.2	515.4	916.7	248
T8 Bulbs to LED	114,411	105.2	455,197	114,411	132,633	1.2	826.8	1,470.6	90

Table 3: Financial Modelling of LED Lighting Upgrades

1.3.2. Loft Insulation

A number of buildings at Bronglais Hospital were identified to have little or no loft insulation, namely Blocks 9-13. Due to the lack of sub-metering on site and the poor resolution of energy consumption for individual buildings, the energy demand figures have been assumed for these buildings based on their estimated floor areas as a proportion of the metered buildings under the Postgraduate supply (Blocks 8 - 13). Current insulation levels of 0-100mm have been assumed throughout with the calculations based on upgrading the current insulation levels to achieve a U-value of at least 0.16W/m²K.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
Block 9	349	2.1	11,412	349	2,703	7.7	20.9	62.7	43
Block 10	451	2.7	14,738	451	3,196	7.1	27.0	81.0	39
Block 11	469	2.8	15,312	469	4,505	9.6	28.0	84.1	54
Block 12	410	2.5	13,398	410	3,179	7.8	24.5	73.6	43
Block 13	275	1.6	8,972	275	2,720	9.9	16.4	49.3	55

Table 4: Financial Modelling of Loft Insulation Upgrades

1.3.3. BMS Upgrades

The BMS infrastructure at Bronglais was identified as being outdated and in need of replacement/ upgrades in places. Estimated saving on energy demand have been assumed based on a 3% saving in energy consumption that could theoretically be achieved with a modern BMS unit.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
BMS Upgrade	9,562	57.2	312,425	9,562	75,000	7.8	572.2	572.2	131

Table 5: Financial Modelling of BMS Upgrade

1.4. Withybush

1.4.1. LED Lighting Upgrades

A high- level visual inspection of the current lighting at Whithybush was undertaken during the site visit. From the site audit, and information provided by HDUHB, it was assumed that 90% of the current light fitting are using T5 bulbs, with 8% using T8 and the remaining 2% with LED bulbs. The calculations have been based on the total floor area of 43,368m² and the assumption that all the lighting is operational for 24 hours a day. Costings do not account for infrastructure upgrades that may be required as part of the works.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
T5 Bulbs to LED	171,405	157.6	681,953	171,405	546,437	3.2	1238.7	2,203.2	248
T8 Bulbs to LED	41,899	38.5	166,700	41,899	48,572	1.2	302.8	538.6	90

Table 6: Financial Modelling of LED Lighting Upgrades

1.4.2. BMS Upgrades

The BMS infrastructure at Whithybush was identified to be now out of date and in need of a more modern replacement/ upgrades. Estimated savings on energy consumption have been assumed based on a 10% saving in gas consumption that could theoretically be achieved with a modern BMS unit.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
BMS Upgrade	53,189	318.3	1,737,908	53,189	235,000	4.4	3183.2	3,183.2	£74

Table 7: Financial Modelling of BMS Upgrade

1.4.3. Voltage Trimming

The site visit identified that the main panel voltage at the hospital is at 420/240 volts where the requirement is 400/240. The furthest point from the main panel also recorded a voltage of 236 volts. It was estimated that 25% of electrical loads were inductive and a 4% saving could be achieved for these loads, equating to a 1% saving across the site in electricity demand. It is also assumed that this work can be carried out internally by the electrical team so the cost to HDUHB is given as neutral.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
Voltage Trim	7,843	7.2	31,206	7,843	0	0.0	56.7	100.8	n/a

Table 8: Financial Modelling of Voltage Trimming

1.5. Glangwilli

1.5.1. LED Lighting Upgrades

A high level visual inspection of the current lighting at Glangwilli was undertaken during the site visit, which returned very similar results to Whithybush. From the site audit, and information provided by HDUHB, it was assumed that 90% of the current light fitting are using T5 bulbs, with 8% using T8 and the remaining 2% with LED bulbs. The calculations have been based on the total floor area of 43,420m² and the assumption that all the lighting is operational for 24 hours a day. Costings do not account for infrastructure upgrades that may be required as part of the works.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
T5 Bulbs to LED	171,610	157.8	682,771	171,610	547,092	3.2	1240.2	2,205.8	248
T8 Bulbs to LED	41,949	38.6	166,900	41,949	48,630	1.2	303.2	539.2	90

Table 9: Financial Modelling of LED Upgrades

1.5.2. Loft Insulation

There are several pitched roof buildings at Glangwilli Hospital that were found to have little or no loft insulation during the site inspection. Due to the lack of sub-metering on site and the poor resolution of energy consumption for individual buildings, the energy demand figures have been assumed for these buildings based on their estimated floor areas as a proportion total site footprint and total energy consumption. Current insulation levels of 0-100mm have been assumed throughout with the calculations based on upgrading the current insulation levels to achieve a U-value of at least 0.16W/m²K.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
Block 18A	379	2.3	12,369	379	5,338	14.1	22.7	68.0	79
Block 18B	309	1.8	10,084	309	4,352	14.1	18.5	55.4	79
Block 18C	371	2.2	12,133	371	5,236	14.1	22.2	66.7	79
Block 18D	304	1.8	9,927	304	4,284	14.1	18.2	54.5	79
Block 19	395	2.4	12,920	395	5,576	14.1	23.7	71.0	79
Block 21	1,507	9.0	49,240	1,507	21,250	14.1	90.2	270.6	79
Block 27	169	1.0	5,515	169	2,380	14.1	10.1	30.3	79

Table 10: Financial Modelling of Loft Insulation

1.5.3. BMS Upgrades

The BMS infrastructure at Glangwilli was identified to be well below current standards and in need of replacement/ upgrades. Estimated savings on energy demand have been assumed based on a 15% saving in gas oil consumption that could theoretically be achieved with a modern BMS unit.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
BMS Upgrade	111,883	542.9	2,024,455	111,883	800,000	7.2	5428.6	5,428.6	147

Table 11: Financial Modelling of BMS Upgrade

1.5.4. Voltage Trimming

Readings taken during the energy audit recorded voltages of 238 volts (single phase) where the requirement is for 230 volts. Additionally, at the furthest point from the main panel, voltages were measured that were in excess of the IET Wiring Regulations Voltage drop parameter of 5%. It is estimated that 25% of the electrical loads are inductive and reducing the voltage from 238 to 230 could achieve 3.5% saving in electricity consumption.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
Voltage Trim	16,364	15.0	65,106	16,364	£0	0.0	118.3	210.3	n/a

Table 12: Financial Modelling of Voltage Trimming

1.6. Prince Phillip

1.6.1. LED lighting Upgrades

As per the other acute sites, a high level visual inspection of the current lighting at Prince Phillip was undertaken during the site visit. From the site audit, and information provided by HDUHB, it was assumed that 85% of the current light fitting are using T5 bulbs, with 15% using T8 and only a negligible amount of LED bulbs. The calculations have been based on the total floor area of 27,586m² and the assumption that all the lighting is operational for 24 hours a day. Costings do not account for infrastructure upgrades that may be required as part of the works.

Opportunity	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
T5 Bulbs to LED	102,972	94.7	409,685	102,972	328,273	3.2	744.1	1,323.6	248
T8 Bulbs to LED	49,972	46.0	198,818	49,972	57,931	1.2	361.1	642.3	90

Table 13: Financial Modelling of LED Upgrades

1.6.2. BMS Upgrades

The current BMS system at Prince Philip was found to have reached its end of life and serious issues were identified over the lack of control of the dual duct AC systems. Additionally, the current controls do not allow for individual ward control, which is leading to overheating. The front end is now also outdated and in need of replacement. This is likely to be a significant outlay for the hospital and require additional infrastructure work that are not accounted for in these costs. Estimated savings on energy consumption have been based on an assumed 15% saving on site gas consumption from a modern BMS replacement.

	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
Opportunity	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
BMS Upgrade	84,498	505.7	2,760,890	84,498	1,000,000	11.8	5056.8	5,056.8	198

Table 14: Financial Modelling of BMS Upgrades

1.6.3. Voltage Trimming

During the energy audit the single phase voltage was recorded at 234 volts. This is slightly higher than the 230 volts required so voltage trimming could provide some energy savings. It is estimated that 25% of electrical loads are inductive and that voltage trimming could achieve 1.7% savings in electrical use.

	Est. Annual Energy Savings			Total Savings (£)	Cost (£)	Simple Payback	Carbon Impact (tCO ₂ e)		
Opportunity	£	tCO ₂ e (2022)	kWh				10 Year Carbon Saving	Lifetime Savings (tCO ₂)	£ / Lifetime tCO ₂
Voltage Trim	1,890	1.7	7,520	1,890	0	0.0	13.7	24.3	n/a

Table 15: Financial Modelling for Voltage Trimming

1.7. HDUHB Solar PV Projects

HDUHB is currently working with the Welsh Government Energy Service to implement a number of solar PV projects during the timeframe of this action plan (see initiatives 10 and 35). A brief summary of these installations are outlined below:

Project	Capacity (kWp)	CAPEX (£)	Payback (yr)	Annual Carbon Saving (tCO ₂)	Annual kWh Saving
Phase 2 (2021/22) - Bronglais	120	147,273	6.84	33.4	120,422
Phase 2 (2021/22) - South Pembrokeshire (Roof-mounted)	54.4	74,581	7.76	15.5	55,903
Phase 2 (2021/22) - Worthybush Hospital Maintenance Block	52.8	65,114	7.78	13.7	49,232
Phase 2 & 3 (2021/22 & 2022/23) - South Pembrokeshire (Car Ports)	120	185,106	9.09	32.8	118,356
Phase 3 (2022/23) - Worthybush Hospital Residential Blocks	177.9	251,286	8.47	48.4	174,539
Phase 3 (2022/23) - Worthybush Hospital Puffin Ward	119.9	123,921	6.78	29.8	107,454
Hafan Derwen, ground-mounted solar PV	500	932,374	12.89	120.4	516,543

Table 16: Solar PV Projects Summary

1.8. Zero Carbon Heating

1.8.1. Non-Acute Sites

It is recommended that 5 non-acute sites are to have their heating upgraded from gas-fired boilers to electric air source heat pumps as a trial ahead of future rollout to further sites as would be outlined in future delivery and action plans.

The sites have been selected based on their current energy intensity metrics. Currently, air source heat pumps are best suited to low flow temperatures, i.e. where there is low demand or significant levels of insulation. In order to determine the non-acute sites with the highest levels of heating efficiency, the gas consumption per metre squared of floor area was used. From this analysis the following sites have been recommended:

- Milford Haven Health Centre
- Pembroke Dock Health Centre
- Gorwellion (MHL D)

- Hafan Hed (MHL D)
- Penlan (MHL D)

The following estimated costs, energy savings and carbon savings are expected for each site:

Site	Heat Pump Sizing (kW _{th})	Energy Saving (kWh)	Carbon Saving (tCO ₂ e)	Energy Cost Saving (£)	System Cost (£)
Milford Haven	35 (ASHP)	36,017	10	-£188	£39,419
Pembroke Dock	35 (ASHP)	24,202	7	-£127	£39,419
Gorwellion	80 (ASHP)	107,689	30	-£563	£88,400
Hafan Hedd	35 (ASHP)	18,602	5	-£97	£39,419
Penlan	100 (ASHP)	134,620	38	-£704	£108,375

Table 17: Heat pump figures for non-acute sites

1.8.2. Heating Surveys

Within the actions it has been determined that specialist low carbon heat evolution plans should be developed at all four acute hospital sites to set out a transition plan away from fossil fuelled heat toward low carbon heat. This will include heat generation, heat distribution, heat emitters, and building fabric upgrades. The evolution plans should consider technologies such as heat pumps, biomass, chiller heat recovery, wider heat networks (where realistic) and other innovative heat solutions such as sewage heat recovery and emerging heat pump technology. Furthermore, low carbon heat feasibility studies at non-acute sites larger than 1000m² should be undertaken.

It is anticipated that consultancy costs for a detailed heat study of acute hospital would cost approx. £50,000 and £10,000 for a large non-acute site. The following costs for each site have been identified:

Site	GIA (m ²)	Cost for heat study (£)
Glangwili General Hospital	50,650	£50,000
Prince Philip Hospital	29,099	£50,000
Bronglais General Hospital	26,331	£50,000
Withybush General Hospital	38,501	£50,000
Hafan Derwen	7,933	£10,000
Canolfan Bro Cerwyn St Nons and St Caradogs	4,159	£10,000
Amman Valley Hospital	2,078	£10,000
Llandovery Cottage Hospital	1,162	£10,000
Tregaron Hospital	1,573	£10,000

South Pembrokeshire Hospital	5,355	£10,000
New Tenby Hospital	1,080	£10,000
Penlan (MHLD)	1,217	£10,000
Total	169,138	£280,000

Table 18: Heat study est. costs

1.9. Transport

Three projects within the list of transport focussed actions have been deemed to be quantifiable. Details of each are below:

The potential savings from a

Project	Energy Saving (unit)	Carbon Saving (tCO ₂ e)	Energy Cost Saving (£)	System Cost (£)
Fleet EVs	90,600 litres -148,136 kWh	229	£82,565	£1,320,000
EV charging	*Electricity consumed at EV charging ports by HDUHB owned fleet will be accounted for in the above line, electricity consumed by others at the charging bays are out of HDUHB's emissions boundary			£779,800
Telematics	5,437 litres	17	£7,155	£6,125

Table 19: Transport actions

1.9.1. Initial Phase of EV Rollout

It is assumed that any fleet vehicle will likely renew its lease every four years, this translates to half the fleet being replaced by electric vehicles in the period 2022-24. Here all diesel vehicles will be switched to battery electric.

1.9.2. EV charging

The potential for 140 EV charging bays have been identified, details are given below:

Site	No. EV Chargers	No. Charging Bays	Total cost of works (£)
Withybush General Hospital	20x Twin	40	£ 182,500.00
Bronglais General Hospital	7x Twin	14	£ 78,000.00
South Pembs Hospital	6x Twin	12	£ 56,000.00
Minaeron Community Centre, A	3x Twin	6	£ 46,900.00
Llandovery Cottage Hospital	3x Twin	6	£ 42,100.00

Hafan Derwen, Carmarthen	1x Twin	2	£ 31,700.00
New Tenby Hospital	2x Twin	4	£ 38,900.00
Cardigan Integrated Care Cen	1x Twin	2	£ 10,700.00
Glangwilli General Hospital	7x Twin	14	£ 87,000.00
Prince Philip Hospital	20x Twin	40	£ 206,000.00

Table 20: EV charging

1.9.3. Telematics

It is assumed that telematics will be installed in all non-electric vehicles, industry standard assumptions state that a 6% saving in litres of fuel can be expected from the introduction of telematics in fleet vehicles.

1.10. Procurement

Two actions identified within the procurement section have been deemed quantifiable, together it is expected they could achieve a combined annual carbon saving of approx. **8,480 tCO₂e**

- 1) An initial reduction in emissions of 10% across the top 100 suppliers through engagement activities. These could be activities such as focussed workshops, encouraging suppliers to reduce emissions, or selecting less carbon intensive products. This is expected to result in an estimated carbon saving of **4,818 tCO₂e pa**. It is anticipated that any engagement programme would cost approx. **£50,000 pa**.
- 2) Through the adoption of WG procurement policy, all suppliers will have had to set a net zero carbon reduction target. If all suppliers were to meet a net zero 2050 target, set in 2022, then supply chain emissions would reduce at an annual rate of 3.6% - resulting in annual carbon savings of **3,662 tCO₂e**.

1.11. Carbon Management

Action	Site	Annual Energy Saving (kWh)	Annual Energy Cost Saving (£)	Annual Carbon Saving (tCO ₂ e)
Best practice energy management	Acute sites	2,375,395	£192,900	494
Behaviour change	Pan HDUHB	393,314	£25,514	82

Table 21: Carbon management

Two within the carbon management focus area have been quantified:

- 1) **Best practice energy management** – Energy management procedures across all four acute sites should be reviewed and updated to be in line with best practice.
- 2) **Behaviour change** – A pan wide behaviour engagement programme should be carried out, this could have particular focus areas for example: switching lights off, turning off equipment, active travel commuting, reduced printing.

1.12. Assumptions

Certain assumptions have been made during the financial modelling of the carbon reduction opportunities identified during the site visits, these are outlined below:

- Electricity price of 0.207 p£/kWh
- Gas Price of 0.024 £/kWh
- Diesel price of 131.6 p/litre
- 4% inflation rate for energy prices
- Discount rate of 3.5%
- Light fittings are assumed to be <2ft (this provides the most conservative cost replacement)
- Measures listed do not account for infrastructure works that may be necessary to ensure optimum operation of proposed measures (e.g., wiring upgrades / heat zoning upgrades)
- Energy use has been taken from FY19/20 data for each site, with energy prices averaged over FY21/22 received for Bronglais Hospital and applied to all sites
- LED lifespans assumed to be industry average of 20yrs, this may be less with high usage
- BMS lifespan assumed to be 10years, this may be higher with high quality installations
- ASHPs have a coefficient of performance (COP) of 2.7
- Boilers are assumed to have an efficiency of 80%

Calculations have been based on site visits and data provided from HDUHB, all figures are indicative only and suitably qualified professionals should be consulted to undertake detailed studies prior to any implementation

Appendix 3: Organisational Roles

Role:
HD Executive Director of Strategic Direction and Operational Plan
Head of Property Services
Assistant Director of Digital Services
Assistant Director of Strategic Partnerships
Head of Strategic Performance Improvement
Transport & Sustainable Travel Manager
Head of Procurement
Senior Workforce Advisor
Senior Environmental Manager
Principle Programme Manager Decarbonisation and Agile Working
Assistant Director Strategic Planning
Director of Estates, Facilities and Capital Management
Senior Procurement Manager
Senior Workforce Manager

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