

Carbon Reduction Assessment of the SBCD Portfolio October 2022



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1. Executive Summary

- 1.1. SBCD portfolio helps to address and support the grand challenge of carbon reduction with the long term aim of achieving Wales's Net Carbon Zero target by 2050.
- 1.2. As acknowledged in the Welsh Government Net Zero Wales Carbon Budget 2 (2021 to 2025), the SBCD Portfolio contains some significant contributions to existing and future national and regional Carbon reduction targets.
- 1.3. As the SBCD was first established in 2017 with all nine headline business cases approved by December 2021 by both Governments, there is no specific decarbonisation investment objective set at a Portfolio level.
- 1.4. In accordance with local and national policy, each Lead Delivery Organisation will ensure that facilities are procured, built, and operated in compliance with the requirements set out in relevant policies and strategies.
- 1.5. Direct contribution is made via all projects that build SBCD infrastructure by achieving BREEAM excellent as a minimum standard. Significant contribution to support the decarbonisation agenda will also be through the delivery of three energy related projects, upskilling of our workforce through the Skills and Talent Programme and enhancement of our digital connectivity through the regional Digital Infrastructure Programme.
- 1.6. The SBCD Portfolio places the region at the forefront of Energy and Smart Manufacturing innovation as part of the drive towards a low carbon economy and will contribute by:
 - i. Creating an estimated 80k+ m² of floorspace with a minimum of BREEAM excellent by 2026
 - ii. Creating at least 5,000 jobs across the renewables and energy sectors
 - iii. Create at least £620m GVA
 - iv. Attract at least £630m of total investment
 - v. Estimated to provide at least 6,000 skills and talent opportunities for the energy and , decarbonisation sectors
 - vi. Create a regional centre of excellence in the renewable energy sector
 - vii. Grow 2 supply chains in the installation, manufacturing and operations of blue and green technologies through PDM And HAPS
 - viii. Enhance digital connectivity through full fibre, 5G and Internet of Things (IoT) to future proof the digital economy across the region
- 1.7. The three energy related initiatives, Homes as Power Stations (HAPS), Pembroke Dock Marine (PDM) and Supporting Innovation and Low Carbon Growth, all have set projects and targets to support the reduction of carbon emissions. They will catalyse this through infrastructure, technology, manufacturing, business growth and supply chains, research and development and future skills development. Project Specific contributions include:

HAPS: The potential for a Homes as Power Stations blueprint that can be rolled out across the region and wider, providing less reliance on carbon fuelled alternatives resulting in:

- 10,300 homes fitted with renewable technology
- 10,417 + KWh energy saving
- 19,000+ CO2 reduction per year

PDM: The work being done by the Pembroke Dock Marine partners to secure a sustainable renewable energy source for South West Wales and beyond achieving a 1,000 MW contribution to decarbonisation targets and will make a significant contribution to achieving the Welsh Government's target of 70% of electricity consumed in Wales from Welsh renewable sources by 2030

Supporting Innovation and Low Carbon Growth: including, the Bay Technology Centre - the first commercial energy positive building in Wales, the decarbonisation of steel production and the shift to low carbon transport, providing a total of 18,500 sqm BREEAM excellent floorspace.

- 1.8 In summary the SBCD Portfolio will make a significant contribution towards the region's carbon reduction aspirations, albeit indirectly in most cases. More directly, Pembroke Dock Marine will make a significant contribution to achieving the Welsh Government's target of 70% of electricity consumed in Wales from Welsh renewable sources by 2030, and HAPS will create a sustainable housing blueprint that can be rolled out across Wales guiding a long-term reduction in domestic carbon reliance.
- 1.9 The primary assumption throughout this review is that all SBCD capital build projects have been costed to achieve BREEAM Excellent at minimum and that the projects remain to be viable noting that costs of any requirements over and above those originally factored in to the Business Cases may need to be funded from other sources.

2. Purpose

- 2.1. This document was developed at the request of the SBCD Programme Board in July 2022 to determine the level of SBCD Portfolio contribution toward carbon reduction for South West Wales. The PoMO co-ordinated an initial assessment by reviewing project and programme business cases and engaging with the project teams which align to the Welsh Government requirements and guidance, the four Local Authority decarbonisation ambitions and other lead deliverer targets.

3. Background

- 3.1. **The Environment (Wales) Act 2016** placed a duty on Welsh Ministers to set targets for reducing greenhouse gas emissions and to set carbon budgets.
- 3.2. During the same period, **The Well-being of Future Generations (Wales) Act 2015** was introduced which places a duty on each public body to carry out sustainable development. The five ways of working set out in the Act aim to help bodies work together better, avoid repeating past mistakes and tackle long term challenges.
- 3.3. The Welsh Government published the first statutory Low Carbon Delivery Plan, **Prosperity for All: A Low Carbon Wales**, and declared a climate emergency in April 2019, closely followed by Local Authorities developing their approaches to net carbon zero with stated targets for 2030.
- 3.4. In March 2021, the Welsh Government set new legal targets for a 63% carbon reduction by 2030, 89% by 2040, and 100% by 2050.
- 3.5. In October 2021, the Welsh Government published their second emissions reduction plan, **The Net Zero Wales Carbon Budget 2**. This sets out specific policies for the public sector, including a target for decarbonisation plans to be in place by March 2023, targets relating to buildings, vehicles and procurement, and development of a new health and social care decarbonisation plan.
- 3.6. **The Net Zero Wales Carbon Budget 2** says of the Swansea Bay City Deal:
"Swansea Bay City Deal has pledged to work together significantly contribute to the Swansea Bay City Region Economic Regeneration Strategy 2013 to 2030. Key projects are delivering outputs aligned to the decarbonisation agenda focusing on energy savings, tackling fuel poverty and carbon reduction. SBCD will respond directly to improve energy efficiency and the transition to a net zero carbon economy, enabling more businesses to become carbon light or free. Specific actions include:
 - Improve business and industry efficiency: Enhancing business energy efficiency through next generation and mobile broadband.
 - Development of the SWITCH and Technology Centre to promote innovation and low carbon growth.

- Improving the energy efficiency of our homes – Homes as Power Stations Programmes (HAPS) will deliver the rollout of innovative energy efficiency homes throughout the Region
 - Accelerate the shift to low carbon transport – directly through the Supporting Innovation and Low Carbon Growth Programme”
- 3.7. The budget also states that “By 2025 all new City and Growth Deals will have carbon reduction at their core and will contain carbon reduction outputs as key metrics for monitoring and evaluation.” Noting the SBCD was established in 2017 and is therefore not classified as a new City and Growth Deal i.e. 2021 onwards, and had already established its Portfolio projects and programmes, along with key investment objectives.
- 3.8. Regionally, **the South West Wales Economic Delivery Plan 2022-2030** states that the region needs to focus on several distinctive economic strengths and assets as a platform for future growth including extensive energy infrastructure and low carbon energy generation potential.
- 3.9. The plan seeks to establish the SBCR as a diverse and low carbon economy and international centre for renewable energy production and conservation. To retain and develop the regional strategic role in energy into green growth and to secure further investment to unlock the full potential of supply chain development.
- 3.10. It also highlights that the region needs to respond to transformational needs that will impact on the economy, its resilience, sustainability and growth including the decarbonisation policy imperative at a national, regional and local level which creates a requirement to seek and develop opportunities for innovation and technology development, as well as a need for adaptation to support industrial resilience.
- 3.11. The decarbonisation need for the region will be undertaken through:
- the delivery of the region’s low carbon projects at scale
 - decarbonising the industrial base
 - decarbonising the wider economy (including housing stock and transportation)
- 3.12. Within its focus on the energy sector, the plan aims to place the region at the forefront of energy innovation in the areas of sustainable house building to address fuel poverty, while creating a centre of excellence to develop and exploit aspects of marine and other sustainable energy. This will exploit the multi-billion-pound asset base in renewable and conventional energy production and the testing and commercialisation of integrated Future Energy Systems for commercial and domestic use. The SBCD portfolio will also contribute directly to the drive towards decarbonisation of the economy and the green industrial revolution including skills for green jobs
- 3.13. For construction projects, the Welsh Government requires that most new buildings promoted or supported by them, or their sponsored bodies, must meet their Sustainable Building Standards. This includes projects procured directly and indirectly. All SBCD new built infrastructure will achieve BREEAM (Building Research Establishment Environmental Assessment Method) Excellent rating as a minimum requirement. See Appendix 2.
- 3.14. To support the Welsh public sector in addressing Net Carbon Zero via procurement, in September 2021 Welsh Government issued the **Welsh Procurement Policy Note WPPN 06/21: Decarbonisation through procurement - Taking account of Carbon Reduction Plans**, last updated in March 2022. WPPN 06/21 adopts the UK Procurement Policy Note 06/21, providing further information specifically to Welsh public sector contracting authorities to help them meet the 2030 target for a net zero public sector in Wales.
- 3.15. In December 2021 Welsh Government also issued **Welsh Procurement Policy Note WPPN 12/21: Decarbonisation through procurement - Addressing CO2e in supply chain**, which advises the Welsh public sector on the actions that can be taken to address CO2e emissions in supply chains for purchased goods and services to help them meet the 2030 target for a net zero public sector. This was also updated in March 2022.

4. Portfolio review

- 4.1. The PoMO undertook an initial review of the programme and project Business Cases as submitted to UK Government and Welsh Government for approval.
- 4.2. It was noted that most of the SBCD Business Cases were in an advanced development stage prior to the 2019 declaration, and a significant number were approved or already in the approval process prior to the announcement of the Net Zero Pathway in March 2021.
- 4.3. As a result, many of the Business Cases have been written without fully integrated Net Carbon Zero targets, although most of the programmes and projects do have carbon reducing elements and synergies to Welsh Government and Local Authority carbon reduction plans, in the main these are secondary outcomes of the schemes and not fundamental outputs.
- 4.4. All Business Cases reference The Well-being of Future Generations (Wales) Act 2015 and acknowledge the requirements therein.
- 4.5. Noting the above, other existing and subsequent, local and national policies will affect how projects are delivered in real time, especially concerning design, construction and procurement.
- 4.6. The key outputs that directly contribute to carbon reduction are summarised in the table below

Digital Infrastructure	Roll out of regional high speed full fibre and mobile broadband, 5G and IOT enabling more low carbon initiatives to be implemented
Skills & Talent	Future skills development including a total of 2,200 additional skills, 14,000 people upskilled, 3,000 new apprenticeship opportunities 3 Centres of Excellence with a potential for two focused on decarbonisation and renewable energy
Home as Power Stations	10,300 homes fitted with renewable technology 10,417 + KWh energy saving 19,000+ CO2 reduction per year
Swansea Waterfront	Kingsway - 10,684 sqm BREEAM excellent floorspace Innovation Matrix - 2,200 sqm of BREEAM: Excellent floor space
Yr Egin	363.4 sqm BREEAM excellent floorspace phase 1
Pentre Awel	50,000 sqm BREEAM excellent floorspace
Campuses	2,700 sqm BREEAM excellent floorspace shared between two locations
Supporting Innovation and Low Carbon Growth	Total 18,500 sqm BREEAM excellent floorspace Creation of Bay Technology Centre – first commercial energy positive building in Wales 1,320 jobs created working in the low carbon sector SWITCH (South Wales industrial transition from Carbon Hub) -industrial research facility helping industry to decarbonise Advanced Manufacturing Production Facility with apprenticeship opportunities Local electric vehicle charging infrastructure to reduce vehicle emissions across the county Increase in Hydrogen production from renewable resources (using excess energy from the BTC)
Pembroke Dock Marine	PDM will make a significant contribution to achieving the Welsh Government’s target of 70% of electricity consumed in Wales from Welsh renewable sources by 2030 and will establish a world-class centre for marine engineering with an immediate focus on low carbon energy leading to 1,000 MW contribution to decarbonisation targets

Further detail can be found in the table at Appendix 1

5. Policy implications

- 5.1. The Net Zero Wales Carbon Budget 2 (2021 to 2025) contains policies and proposals across all ministerial portfolios which are, or will be, incumbent on Local Authorities and Public Bodies to deliver.
- 5.2. This will require SBCD Lead Delivery Organisations (LDO's) to be aware of their responsibilities and to assess how these may affect future delivery of the Programme and Project outputs within the SBCD Portfolio.
- 5.3. Lead Delivery Organisations will need to consider how, within their own Net Carbon Zero plans, the requirements apply for any new design or build yet to be procured and delivered. This is not without cost and is currently being assessed by Welsh Government under the Sustainable Communities for Learning (formerly 21st Century Schools) programme where the transition from BREEAM Excellent to Net Carbon Zero is estimated to add £375/m² in 2022 rising to £405/m² in 2024.
- 5.4. It should be noted that there is no indication yet that this requirement is being applied to the SBCD by Welsh Government however this does not detract from the legal obligations as outlined in the Wellbeing of Future Generations Act nor Planning Policy Wales (currently addition 11) objectives
- 5.5. With the exception of HAPS and PDM, most of the assets being delivered by the SBCD Portfolio will remain within the Local Authority/Public Sector estate and will thus be managed accordingly within the requirements of the Net Zero Wales Carbon Budget 2 and the owning organisations' Net Carbon Zero plans.
- 5.6. The primary assumptions throughout this review are that:
 - a) Capital build projects have been costed to achieve BREEAM Excellent at minimum and that any requirements over and above those originally factored in to the Business Cases may need to source extra funding.
 - b) Those elements of the Portfolio yet to be designed and procured remain cost effective to deliver.

6. Links to resources, policies and guidance

The Well Being of Future Generations (Wales) Act 2015

<https://www.futuregenerations.wales/about-us/future-generations-act/>

Net Zero Wales Carbon Budget 2 (2021 to 2025)

<https://gov.wales/net-zero-wales-carbon-budget-2-2021-2025>

Planning Policy Wales, Addition 11

https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

The Low carbon delivery plan

<https://gov.wales/low-carbon-delivery-plan>

Welsh Procurement Policy Note WPPN 06/21: Decarbonisation through procurement - Taking account of Carbon Reduction Plans

<https://gov.wales/wppn-06-21-decarbonisation-through-procurement-taking-account-of-carbon-reduction-plans>

Welsh Procurement Policy Note WPPN 12/21: Decarbonisation through procurement - Addressing CO2e in supply chain

<https://gov.wales/wppn-12-21-decarbonisation-through-procurement-html>

Sustainable Communities for Learning Guidance see annex 9 and 16a

<https://gov.wales/sustainable-communities-learning-business-case-guidance>

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APPENDIX 1 Project Net Carbon Zero Contributions

Below is an initial summary of the key carbon reduction contributions contained within the SBCD Portfolio noting that some programmes and projects are more advanced than others and some have more focus in the carbon reduction sector and hence have more clarity of potential carbon reducing achievements

HAPS	10,300 homes fitted with renewable tech			
	10,417 + KWh energy saving			
	19,000+ CO2 reduction per year			
	The key assumptions adopted from the case studies undertaken by the Cardiff University are shown in Table 4 along with the key values adopted for a new build or retrofit, occurring in 2020. The total value is the sum of the value of each type of fuel saving plus the income from producing electricity. For example, for new build the total value in 2020 per home is: the value of gas saving (£149) plus value of electricity saving (£337) plus income from electricity production (£641) = £1,127 x 50% = £564.			
	Table 2.4: Energy Saving Value/house HAPS Project Test-bed Homes			
	New Build (per house)		Retrofit (per house)	
	Technologies adopted include: Mechanical Ventilation with Heat Recovery (MVHR) Air Source Heat Pump (ASHP) Solar PhotoVoltaics and Batteries		Technologies adopted include: Mechanical Ventilation with Heat Recovery (MVHR) Ground Source Heat Pump (GSHP) Solar PhotoVoltaics and Batteries	
	Energy saving gas	8249 kWh/year	Energy saving oil	9737 kWh/year
	LRVC gas (2020)	1.81p/kWh	LRVC oil (2020)	4p /kWh
	Value saving gas	£149	Value saving oil	£393
	Energy saving electricity	3230 kWh/Year	Energy saving electricity kWh	680
	LRVC electricity (2020)	10.42p/kWh	LRVC electricity (2020)	10.42p/kWh
Value saving electricity	£337	Value saving electricity	£71	
Income from electricity production	£641	Income from electricity production	£1051	
Cost adjustment factor	50%	Cost adjustment factor	50%	

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Total value per home (2020)	£564	Total value per home (2020)	£758
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Note: this table refers to 2020 for ease of presentation, all values incorporated into the CBA are adapted for the number of new builds and retrofits over time, as well as changes in LRVC

*converted from LRVC price/litre to kWh using 10.122 as per Supplementary Guidance

Table 2.5: Reduction in Greenhouse Gases, HAPS Project Test-bed Homes

New Build (per house)		Retrofit (per house)	
Non-traded CO2 reduction	1179 CO2	Non-traded CO2 reduction	2068 CO2
Non-traded carbon price	£69/tCO2	Non-traded carbon price	£69/tCO2
Non-traded value	£81	Non-traded value	£144
Traded CO2 reduction	4366 CO2	Traded CO2 reduction	2501 CO2
Traded carbon price	£14/tCO2	Traded carbon price	£14/tCO2
Traded carbon value	£61	Traded carbon value	£53
Cost adjustment factor	50%	Cost adjustment factor	50%
Total value per home (2020)	£71	Total value per home (2020)	£99

Table 2.6: Fuel Poor Households in Swansea Bay City Region, 2018

Local authority area	Total households	Fuel poor households	Fuel poor %
Pembrokeshire	51,761	12,083	23%
Carmarthenshire	76,771	18,934	24%
Swansea	100,787	24,394	24%
Neath Port Talbot	58,780	14,450	24%
Regional Total	288,099	69,861	24%
All Wales	1,265,000	291,000	23%

Note: updated figures from Welsh Government stats released in April 22 highlighted the Wales figure for fuel poverty to now be 45%.

Skills	Future skills development including <ul style="list-style-type: none"> • 2,200 additional skills
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	<ul style="list-style-type: none"> • 14,000 people upskilled • 3,000 new apprenticeship opportunities • 3 Centres of Excellence with a potential for two focused on decarbonisation and renewable energy <p>Over the longer term the Skills and Talent Initiative will be assessing future skills needs in a Zero Carbon future, providing the right skills for future needs. An early pilot project already in place focuses on the renewable energy sector and it is reasonable to assume that this may be the start of a renewables centre of excellence being developed.</p>
Digital	<p>Roll out of regional high speed full fibre and mobile broadband, 5G and IOT enabling more low carbon initiatives to develop. Advanced Digital Infrastructure enables many other social benefits, in relation to carbon reduction. These are linked to travel reductions, more access to remote working and other potential long term requirements such as reutilising existing infrastructure, alternative services and potentially reducing future construction activity giving a reduction in carbon footprint, over a longer period of time</p>
Yr Egin	<p>363.4 sqm BREEAM excellent floorspace phase 1</p> <p>Yr. Egin 1 provides 40,000 sq ft for Welsh Media company S4C and the University's new media faculty and offices, was constructed prior to the announcement of a climate emergency. However, the building has a large amount of energy efficient design achieving a BREEAM excellent rating for sustainability as per WG guidelines.</p> <p>Examples of what has been incorporated within the design areas follows:</p> <ul style="list-style-type: none"> • Ie PVs, Cycle provisions, public transport management plan, passive building management etc
PDM	<p>1,000 MW contribution to decarbonisation targets</p> <p>The programme will establish a world-class centre for marine engineering with an immediate focus on low carbon energy Pembroke Dock Marine provides the support structure for the growth of an industry that targets the generation of decarbonised energy</p> <ul style="list-style-type: none"> • Directly contribute to UK and Welsh decarbonisation targets by enabling industry to upscale devices efficiently to harness 1GW of marine derived energy. • Align with UK aims to establish a decarbonised energy generating industry in order to meet 2050 net zero emissions targets. <p>PDM elements will play a critical part in bringing down the current cost of marine derived energy to a more acceptable level to become comparable with other decarbonised energies such as nuclear.</p> <p>PDM will make a significant contribution to achieving the Welsh Government's target of 70% of electricity consumed in Wales from Welsh renewable sources by 2030,</p> <p>In terms of securing the economic benefits of the transition to a low-carbon economy, research²⁹ indicates that an installed capacity of 60MW, 300MW and 1GW in Wales alone would return £72m, £303m and £840m of GVA. Additionally, 60MW, 300MW and 1GW of</p>

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	<p>installed capacity is expected to create, 2,030, 8,510 and 23,760-person years of employment respectively across the manufacturing and energy, construction and maintenance, distribution, transport and communications and professional and public services sectors.</p> <p>Marine energy technologies have the potential to displace coal and natural gas generation on the grid and to reduce CO2 emissions permanently by at least 1MtCO2 per year after 2030 and at least 4MtCO2 per year after 2040</p> <p>Cost Reduction Tidal stream has potential to reach LCOE of £150 per MWh by 100MW installed, reducing to £90 per MWh by 1GW and £80 per MWh by 2GW. Further reductions are possible with additional focus on innovation and continued reductions in cost of capital towards levels coming through in offshore wind.</p> <table border="1" data-bbox="371 624 1400 735"> <thead> <tr> <th colspan="4">Environmental benefits (discounted, 2018 price)</th> </tr> <tr> <th></th> <th>Option 2</th> <th>Option 3</th> <th>Option 4</th> </tr> </thead> <tbody> <tr> <td>Carbon Dioxide (CO2) savings</td> <td>£8.2 million</td> <td>£2.5 million</td> <td>£8.2 million</td> </tr> </tbody> </table>	Environmental benefits (discounted, 2018 price)					Option 2	Option 3	Option 4	Carbon Dioxide (CO2) savings	£8.2 million	£2.5 million	£8.2 million
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<p>Swansea Waterfront</p>	<p>Total: 12,884 sqm BREEAM excellent floorspace</p> <p>The programme includes low carbon strategies will be at the heart of the design and build of the new developments, to cut energy use and contribute to a low carbon economy in Wales. Including use of Solar panels providing a % of required energy use, LED lighting and has achieved a 64% materials in construction procured from Wales</p> <p>71/72 Kingsway Floor area: 10,684 sqm, BREEAM: Excellent projected and will be operationally carbon zero. 71/72 Kingsway includes some innovative features to ensure its operationally carbon zero rating. The new development will include a green roof terrace, solar panels on top of the building, trees on each level, underfloor heating and heat recovery systems to minimise energy use with a rainwater capture feature, helping with water supply to plants and trees in and around the building. Glazing throughout the development will allow natural light into the building, further reducing energy consumption. The new pedestrian link between The Kingsway and Oxford Street the development is providing will be lined with greenery and flora. The building is situated on an active travel route, minutes from the city’s main bus and rail stations. Recent improvements on The Kingsway have facilitated Swansea’s push for more carbon neutral ways of travelling, providing wide walkways and cycleways leading off the development. There will also be a bus stop immediately outside the building.</p> <p>Innovation Matrix Floor area 2,200m2 of BREEAM: Excellent high-quality floor space which complements the University’s existing IQ and Y Fforwm buildings, in the heart of UWTSU’s Innovation Quarter. With aspirations to achieve net carbon zero, RIBA 2030 climate challenge applying intelligent building systems and having a “cradle-to-grave” construction strategy.</p>												

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Pentre Awel	<p>50,000 sqm BREEAM excellent floorspace</p> <p>Pentre Awel Zone 1 will include a significant amount of carbon reducing technologies:</p> <ol style="list-style-type: none">1. The building is on target to achieving a BREEAM Excellent rating. With respect to Energy credits and (in particular Ene01 which focusses on the building performance for energy efficiency and carbon emissions reduction) the building is currently achieving between 4-6 credits (to be verified by the BREEAM Assessor) which is in excess of the mandatory minimum for the targeted Excellent rating.2. Fabric First Approach Throughout the design process the design team has endeavoured to minimise the building energy demand through passive design, supplying energy effectively and utilising renewable energy measures. To complement the fabric first approach in minimising energy demand the building is targeting a construction air permeability of 3 m³ /h.m² at 50 Pa. This is a significant reduction compared to the regulatory minimum performance of 10 m³ /h.m² at 50 Pa, which will benefit the scheme in reducing primary energy demand3. Mechanical and electrical design considerations<ul style="list-style-type: none">• Natural daylight to be utilised wherever practical to reduce the energy use associated with electrical lighting.• Reduced direct solar gain to reduce the need for comfort cooling or air conditioning.• Daylight to be balanced against solar gain.• Solar control glazing will be used on all facades.• High efficiency lighting system (LED) will be provided with presence and absence detection controls, provision of manual control still an option where room function requires this.• High efficiency lighting system (LED) at the perimeter of the building will be provided with daylight linked dimming controls.• Natural ventilation will be utilised whenever possible to reduce the energy use associated with mechanical ventilation and cooling (operation and acoustic dependent)4. Air Source Heat Pumps The energy strategy incorporates Air Source Heat Pumps (ASHP) as the primary source of heating provision for the whole building. The design has developed to allow the ASHPs to deliver the bulk of the heating demand and to deliver the base load of the building. There will be times of the year when the ASHPs will be supplemented with heat top up from alternative gas boilers, however, The heating system design has been optimised to maximise the heat input from the ASHP.5. Ventilation The building is provided with multiple forms of ventilation generally comprising of either natural or mechanical ventilation proposals. The use of natural ventilation has been provided wherever possible to minimise the use of energy intensive form of ventilation6. Rainwater harvesting Rainwater harvesting is provided to offset the water demand of the building7. Photovoltaic (PV) panels
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	<p>PV panels are provided at roof level of the building to provide an onsite electric generation source. The overall area of PV panels has been optimised to deliver the energy savings that contribute to the compliance aspects (energy demand and carbon emissions – Approved Document L2A) and also the credits achieved under BREEAM Ene01. The extent of PV allocation comprises of circa 1250m² panel area which aims to deliver 150 kW peak electricity generation and offset incoming grid derived electricity by some 176,000 kWh per annum</p> <p>8. Electrical Vehicle (EV) charging Up to 10% of the total parking provision within the Zone 1 development will be served by EV charging. 33 spaces in total (29 standard spaces, 4 accessible spaces)</p> <p>9. Future proof design and heat network The first phase of development at Pentre Awel has been progressed with a focus upon dedicated heat generation being delivered from within the confines of the Zone 1 energy centre. Carmarthenshire County Council (CCC) does, however, have a desire to maximise future opportunities through the development of adjacent Zones and, as such, the Zone 1 scheme has been designed to be capable of accepting district heating mains (linked to adjacent energy/heat provision) when available and developed in greater detail as part of the wider site development. To enable this to happen the primary heating circulation, within the Zone 1 energy centre, features capped connections to the distribution pipework that are capable of being connected to an adjacent heat network. This will allow for future flexibility with an opportunity to deliver additional project benefits</p> <p>10. Construction Related Activities/On site operations There will be a number of construction related objectives and measures to deliver during site operations. Primarily these will be focused upon –</p> <ul style="list-style-type: none"> • Minimising carbon miles - and emissions on site • Minimising carbon miles – and emissions from delivery of materials • Maximising the use of recycled and reasonably sources materials • Appropriately mitigating site waste • Reducing and monitoring embodied carbon within the building • Waste management, protecting and enhancing the biodiversity and ecology at Pentre Awel <p>Pentre Awel was one of the first projects in the UK to be awarded 100% funding from the Department for Business, Energy and Industrial Strategy to undertake a heat network feasibility study that will explore options for low carbon heat and energy recovery. This will support Carmarthenshire County Council’s efforts to become a net zero carbon local authority by 2030.</p>
<p>SILCG</p>	<p>Total 28,500 sqm BREEAM excellent floorspace Bay Technology Centre – 18,500sqm state of the art building of modern office and Laboratory space being the first commercial energy positive building in Wales. The innovative design and use of materials will provide a sustainable building that is energy positive with excess energy being used to generate hydrogen within the site. Innovative use of materials includes specialist photovoltaic panels made to look like cladding, and a ‘thermal mass’ of exposed precast floor slabs that can store and transfer heat from the building providing a cost effective heating solution. Winner of Net Zero Award in the 2022 Constructing Excellence Wales (CEW) Awards.</p>

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	<p>1,320 jobs created working in the low carbon sector</p> <p>SWITCH – A proposed 4,000 m2 BREEAM excellent specialised industrial research facility created to enhance applied research for steel & metals industry - helping industry to decarbonise</p> <p>Advanced Manufacturing Facility – A proposed 6,000 m2 Specialist hybrid facility providing a range of industrial / production units with pilot line and office space with apprenticeship opportunities.</p> <p>Air Quality Monitoring – monitoring levels of air pollution and informing necessary change.</p> <p>The programme also includes supplying Local electric vehicle charging infrastructure to reduce vehicle emissions across the county and a hydrogen stimulus project increasing Hydrogen production from renewable resources (excess energy from the BTC).</p>
Campuses	<p>2,700 sqm BREEAM excellent floorspace</p> <p>2000m2 of research and innovation for Sports Tech and Med Tech development serving as the gateway to the future sports village.</p> <p>700m2 Institute of Life Science innovation at Morriston Hospital co-locating commercial and academic collaboration alongside clinical R&D</p>

APPENDIX 2 – BREEAM

In May 2009 the Welsh Assembly Government published a Ministerial Interim Planning Policy Statement (01/2009) Planning for Sustainable Buildings. This set out an expectation for most new developments seeking planning permission to achieve a minimum sustainable building standard. This was consolidated into section 4.11 of Planning Policy Wales. This was amended in October 2010 when changes were made to England and Wales Building Regulations Part L2A which introduced more stringent requirements for carbon emissions for both residential and non-residential dwellings. In July 2011, BRE introduced an updated BREEAM3 Scheme Document for New Construction (SD 5073), which describes the new environmental performance standard against which new, non-domestic buildings in the UK can be assessed, rated and certified.

BREEAM (Building Research Establishment Environmental Assessment Method) provides a holistic sustainability assessment framework measuring sustainable value in a series of categories and validating its performance with third party certification.

For non-residential developments, a BREEAM rating or an equivalent quality assured scheme may be required based on building floor area:

Building floor area	Policy requirement
<=250 m ²	Exempt
251 to 1,000 m ²	No BREEAM required. Part L+10%* required (10% improvement over the Target Emission Rate (TER) for current Part L of the Building Regulations)
1001 to 2000 m ²	BREEAM 'Very Good' with 'Excellent' for Energy Credits (ENE01)
2001+m ²	BREEAM 'Excellent'

There are exceptions to the BREEAM requirement, some of which may affect projects within the Portfolio e.g. the Campuses refurbishment at Morriston and PDM hangar annexes refurbishment (not exhaustive as other criteria apply):

- all buildings with a floor space of 250m² and under
- all extensions, alterations, refurbishments and change of use of existing buildings
- where Welsh Government provides less than £1,000,000 of financial aid