

North Wales Economic Ambition Board

Emissions and Biodiversity – technical annex



See Appendix A for a glossary of key terms

1. Background

The North Wales Growth Deal has been signed at a time when countries globally are grappling with the need to dramatically cut greenhouse gas (GHG) emissions and address widespread biodiversity loss.¹ While UK and Welsh Government strategies and guidelines (e.g. HM Treasury Green Book) are being rapidly updated, political pressure for more urgent decarbonisation and reversal of biodiversity loss continues to grow and is likely to intensify this year through Joe Biden’s climate summit and the UK hosting COP26 in November. The UK’s Sixth Carbon Budget² emphasises urgent progress on decarbonisation across all sectors of the economy and sets out clear pathways by sector.

There are substantial opportunities for North Wales and the Growth Deal in this changing landscape, particularly around green energy production, low carbon manufacturing and the circular economy, food production and tourism.

However, a key risk identified by the Portfolio Management Office (PMO) is that Growth Deal projects could inadvertently *increase* regional carbon emissions and biodiversity loss, despite all local authority councils in the region making commitment to avoid doing so.³ While the Green Book that guides project development *suggests* undertaking emissions analysis⁴ and natural capital’ impact assessments⁵, these are largely voluntary and may not provide the information the PMO and North Wales Economic Ambition Board (NWEAB) needs to make a full and informed decision. The consequence of proceeding without this information may mean Growth Deal projects risk making it harder for individual councils and national governments to deliver on their 2030 net zero and biodiversity commitments and potentially expose the Board to the following:

- Reputational risk: if the public consider the Growth Deal is not adequately preparing the region for a low carbon future and adequately mitigating biodiversity loss, there may be a public backlash.
- Legacy risk: if Growth Deal infrastructure is not fit for our low-carbon future, the consequences will be felt for 30 - 100+ years (the lifetime of the infrastructure).
- Potential funding risk: if donor Governments consider NWEAB and the PMO are not adequately accounting for climate and biodiversity in our project assurance processes, they may pull funding.
- Strategic risk: if we do not provide opportunities through our projects for our region to develop expertise in low carbon, ecologically sound operations (e.g. low carbon construction methods) we may perpetuate existing inequalities between North Wales and comparable regions elsewhere in the UK who are delivering projects using these approaches / standards.

The UK Climate Commission’s Sixth Carbon Budget published in December 2020 states “The UK needs to increase its ambition on climate change adaptation, as it is not prepared even for the 1.5-2°C world”. For

¹ See Appendix B – UK and Welsh Government commitments

² Climate Change Commission (2020) [UK’s 6th Carbon Budget](#)

³ See Appendix C – Summary of Council and Partner positions regarding climate and ecological emergency

⁴ HM Treasury’s Green Book provides specific guidance on how analysts should quantify and value energy use and emissions of greenhouse gases (GHGs). It is intended to aid the assessment of proposals that have a direct impact on energy use and supply as well as those with an indirect impact through planning, land use change, construction or the introduction of new products that use energy.

⁵ HM Treasury’s Green Book proposes an Enabling a Natural Capital analysis for identification of costs and benefits early in project development.

North Wales, climate change will be experienced as sea level rise (predicted as 38cm in Llandudno by 2080), storms, precipitation and flooding, temperature extremes, and increased pests and diseases impacting on food supply and biodiversity.⁶ These changes are anticipated to have the greatest impacts on infrastructure (flooding, degradation), public water supply (contamination, shortages), land management, ecosystems and agriculture (e.g. soil loss, storm damage to crops, livestock) - with impacts interacting to cause unprecedented damage.⁷

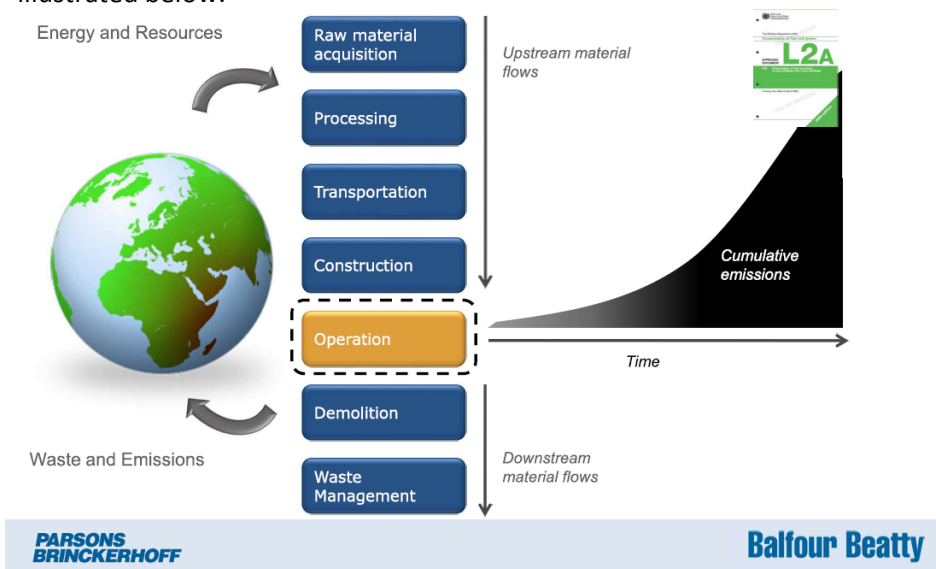
HM Treasury’s 2021 report on ‘The Economics of Biodiversity’ expresses the risk clearly: “We are facing a global crisis. We are totally dependent upon the natural world. It supplies us with every oxygen-laden breath we take and every mouthful of food we eat. But we are currently damaging it so profoundly that many of its natural systems are now on the verge of breakdown.”⁸ For a given ecosystem, communities with robust biodiversity are likely to be better able to adapt to climate change and climate variability than impoverished ones.

1.1. Greenhouse gas (including carbon) emissions

Pathways for the action required have been developed sector by sector internationally⁹ and for the UK¹⁰ with work underway to reflect those pathways for Wales and North Wales. However, action must be taken region by region, town by town and project by project to meet targets and ‘stay on’ the pathways described.

In particular, most Growth Deal projects have a substantial infrastructure element. The built environment is responsible for almost 40% of the global energy and process-related CO2 emissions, which continue to increase.¹¹

The Green Book emissions guidance describes how policy and project interactions in one sector can impact on emissions in other sectors e.g. how planning decisions may impact on transport emissions as well as emissions from buildings. However, the guidance is less clear on how to manage through the business case development and appraisal process a project that drives emissions across sectors throughout the ‘whole life’ of the project – illustrated below.



⁶ [Prosperity for All: Climate Conscious Wales A climate change adaptation plan for Wales – Technical Annex](#)

⁷ Committee On Climate Change (2020) ‘[Interacting Risks In Infrastructure And The Built And Natural Environments – Confidential](#)’ Project No.: 70051310, April 2020

⁸ [The Economics of Biodiversity: The Dasgupta Review](#). HM Treasury, February 2021.

⁹ [Climate Action Pathways | UNFCCC](#)

¹⁰ [Sixth Carbon Budget - Climate Change Committee \(theccc.org.uk\)](#)

¹¹ UNEP 2019 [Global Status Report for Buildings and Construction Sector](#)

During this life cycle, the greatest opportunities for emissions reduction come from the materials acquisition and processing stages and the operational phase.

- i. **Operational emissions are typically only a portion of total emissions generated by an infrastructure project**, as illustrated in Figure 2 (operational emissions in light and dark grey). Other emissions are generated through materials sourcing and processing, transport and construction (dark purple) and through emissions during the use of the building (e.g. emissions from HFC blown insulation; in light purple). Further emissions are generated from demolition and waste at end of life, not captured in the diagram below. Focusing solely on operational emissions will miss ‘easy wins’ mitigating emissions at other life cycle stages and miss local supply chain opportunities (e.g. local material sourcing with lower transport miles).

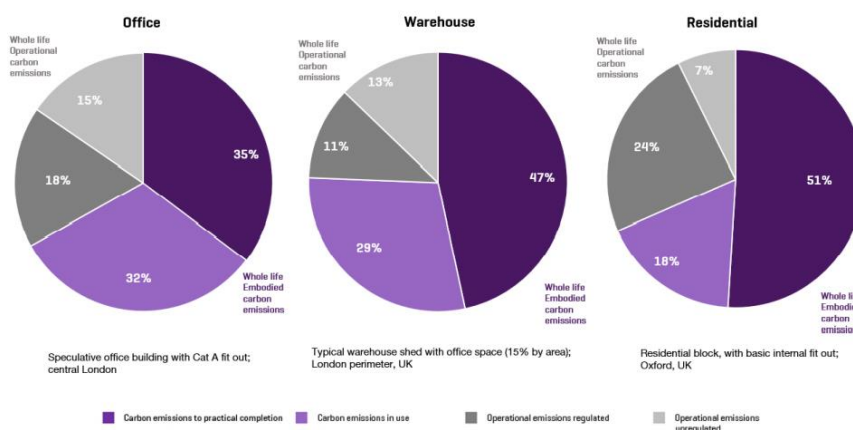


Figure 1: Total whole life carbon emissions breakdown for different building types © Sturgis Carbon Profiling; [From RICS Whole Life Emissions Analysis](#)

- ii. **Achieving net zero in operational emissions only may not offer the best value for money pathway.** External expertise is needed to confirm the most appropriate assessment methodology, but the well-known BREEAM framework provides a useful example, particularly as many project partners have delivered projects to BREEAM Good to Excellent standards previously (see Appendix D). However, BREEAM Very Good to Excellent rating only delivers a 22% reduction in operations emissions on average, with additional cost <1%, recoverable over 5-10 years. A BREEAM Outstanding rating potentially only delivers a 66% reduction in operations emissions, with additional costs around 10%, and costs recoverable over 25 years. This approach could lead to considerable expenditure but not realise the ambition of net zero in operations, while missing the ‘easy wins’ described above.

BREEAM is used here as an example as costs and outcomes have been studied over time and for different structures, but their position on emissions is still emerging¹² and it seems alternatives approaches might deliver the ambition of the Portfolio Board more cost effectively and provide a better framework for analysis. External expertise will be required to confirm best practice in this area, but options include:

- PassiveHouse – e.g. [UK’s First Non-domestic PassiveHouse building](#)
- [CEEQUAL for Infrastructure](#) - e.g. [Colwyn Bay Waterfront](#)

To address the driving risk of inadvertently increasing emissions across the portfolio, it is likely that a Whole Life Emissions analysis (see Figure 1) will be needed for all projects to provide understanding of emissions sources and options for mitigation. This can be provided by application of the RICS standard.¹³

¹² BREEAM’s approach to Net Zero <https://sway.office.com/JL0etxldfQUPj12k?ref=Link>

¹³ <https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the-built-environment-november-2017.pdf>

1.2 Biodiversity

A paper released in early February 2021 by the UK National Infrastructure Commission¹⁴ informed by the Dasgupta Review 'The Economics of Biodiversity'¹⁵ finds that development for housing and infrastructure (particularly transport and utilities infrastructure) is causing habitat loss, fragmentation and degradation. It links this finding to the dramatic decline of natural capital in the UK – a 13 per cent decline in average species abundance since 1970, and 15 per cent of species threatened with extinction. This position is in line with DEFRA findings that regulatory compensation habitat creation schemes over recent years have unreliable outcomes,¹⁶ a finding they have drawn on to launch a more ambitious policy of 10% biodiversity net gain from all development schemes through the scenarios outlined in Figure 1.

Also released in February 2021, the Planning Policy Wales 11 guidance strengthens the commitment towards 'net benefit for biodiversity': Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development *should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity*.

Climate change and biodiversity enhancement are inextricably linked:

- Communities with robust biodiversity are likely to be better able to adapt to climate change and climate variability than impoverished ones.
- Enhancing the biodiversity of a site can mitigate or offset emissions of greenhouse gas emissions leading to climate change.

2. Factors to consider regarding the proposed position statement

All North Wales local authority councils have made commitments to working towards net zero and addressing biodiversity loss, as have many Growth Deal partners. Several North Wales council leaders have also committed publicly to ensuring climate change and biodiversity loss is a priority for NWEAB and that Growth Deal decisions consider these issues.

Factors to consider in agreeing a position statement should include:

- The extent of our control and influence
 - Tackling operational and embodied emissions and meeting biodiversity net gain standards is within our control.
- Our commitment in the Proposition Document "to achieve sustainable, balanced and inclusive economic growth".
 - Emissions reduction and reversal of biodiversity loss are key elements of sustainability, as captured in the Well-being of Future Generations Act: "development which meets the needs of the present without compromising the ability of future generations to meet their own needs."
 - Other regions also racing to tackle this issue and building expertise in low carbon technologies across regional supply chains - a delay for North Wales could expand inequalities between our region and elsewhere in the UK, and limit long-term employment prospects for regional workers (e.g. low carbon construction methods / agriculture, approaches to reducing energy/emissions while expanding digital capacity, or boosting regional capacity in biodiversity enhancement).

¹⁴ National Infrastructure Commission (2021) '[Natural Capital And Environmental Net Gain: A Discussion Paper](#)'

¹⁵ [The Economics of Biodiversity: The Dasgupta Review](#). HM Treasury, February 2021.

¹⁶ DEFRA: Business Case for Biodiversity Net Gain (2019) compensation habitat creation schemes have a reported success rates that range from 0% (where success is defined as fully ecologically functioning habitats) to 74% in long-term, well-established offsetting schemes. Other studies have found lower success rates of between 6 and 20%
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/839610/net-gain-ia.pdf

- Widespread and growing public recognition that sustainability requires ambitious and focused action on energy use, emissions and biodiversity enhancement across all sectors.
 - UK and Welsh Government Manufacturing Manifestos prioritise the issue e.g. one of three key outcomes from Wales Manufacturing Plan: ““a green economy which demands high levels of circularity, where resources are kept in use adding economic value and where waste is avoided. This economy is integral to a low carbon society, so we need to invest in low-carbon and climate resilient infrastructure, renewable energy projects, whole system thinking/design and sustainable homes.”
 - Private sector partners such as Airbus founding Mission Possible (Jan 2021) committing industries reliant on fossil fuels to net zero; increasing recognition by large food companies (e.g. Nestle) of their supply chain reliance on biodiversity.
- Funding is increasingly focused on and available for work in this area:
 - E.g. An ambitious new scheme developing a net zero industrial zone in South Wales will benefit from nearly £20 million UK government funding and could create 5,000 new jobs, announced March 2021 <https://businessnewswales.com/20-million-funding-for-south-wales-green-cluster/>
- Commitments from similar agencies in our region, particularly the Northern Powerhouse and other regional/city growth deals.
 - Some UK local authorities (e.g. Brighton and Hove, London boroughs) already require a Whole Life Emissions Analysis approach
 - [West Yorkshire Combined Authority](#) is tackling these same questions.

3 Risks, opportunities, costs and benefits

Key risks of not taking this action include

- Reputational risk: if the public consider the Growth Deal is not adequately preparing the region for a low carbon future and adequately mitigating biodiversity loss, there may be a public backlash.
- Legacy risk: if Growth Deal infrastructure is not fit for our low-carbon future, the consequences will be felt for 30 - 100+ years (the lifetime of the infrastructure) i.e. white elephants soon after construction.
- Potential funding risk: if donor Governments consider NWEAB and the PMO are not adequately accounting for climate and biodiversity in our project assurance processes, they may pull funding.
- Strategic risk: if we do not provide opportunities for our region to develop expertise in low carbon, ecologically sound operations (e.g. low carbon construction methods) we may perpetuate existing inequalities between North Wales and comparable regions elsewhere in the UK who are delivering projects using these approaches / standards.

Risks and potential implications from proceeding

- Potential cost increase could make projects unaffordable for project sponsors resulting in a need to reduce the scope of the project or secure additional funding. Additional costs could be offset against savings over time.
- The scope and overall number of projects to be delivered through the Growth Deal may have to be reduced to enable any additional funding requirements to be met. This could reduce the overall impact of the Growth Deal (e.g. reduced number of jobs).
- There may be a delay in project development timetables to enable projects to meet the ask from the NWEAB.
- The market may not be able to deliver on our aspirations. For example, the sector may not be able to deliver the construction phase in a net-zero way.

Key benefits and opportunities from proceeding

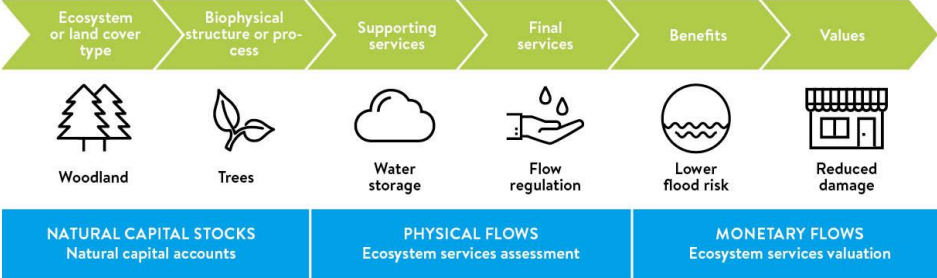
- The opportunity to play a leading role in the transition to a low carbon future, providing an exemplar for other regions to visit and learn from.
- By combining energy efficiency measures and low and zero carbon (LZC) technologies substantial savings can be made over the project lifetime e.g. 44% savings in carbon emissions can be achieved for just 0.26% increase in capital cost, with payback over 10 years.
- Investment in biodiversity enhancement attracts funding that is increasingly available from water companies, carbon brokers, equity bond developers etc. looking to offset their emissions.
- Taking meaningful, ambitious action on these two issues reinforces core values of North Wales around engaging with the natural world, authenticity, pride in our legacy.
- Fully embracing a low carbon, sustainable future will put North Wales ahead of other regions for jobs, skills, resilience – strengthening opportunities for future generations
- One strategy for reducing emissions will be to localise supply chains to minimise transport costs, increasing opportunities for local contracts, local material suppliers etc. driving innovation.

Indicative costs and resource implications

- Additional cost for the PMO would include support identifying the most appropriate tools for analysis based on experience of other councils (who are also exploring this in parallel) – approx. £5k
- Additional cost for project sponsors (including NWEAB) would include
 - Consultant costs for conducting the emissions and biodiversity analysis. Some analysis would be required anyway as part of permitting, so this cost is likely to be incremental (£2-5k).
 - Costs of designing solutions to minimise and mitigate emissions and biodiversity impacts (variable by project).

Appendix A:

Glossary of key terms

Greenhouse gas emissions	A greenhouse gas (“GHG”) is an atmospheric gas which absorbs heat and warms the planet. The main ones are water vapour (H ₂ O), carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (NO ₂), ozone (O ₃), chlorofluorocarbons and hydrofluorocarbons. Carbon dioxide is the most common GHG that is emitted due to human activity. GHGs collectively can be expressed as a single number using the term “carbon dioxide equivalent” (CO ₂ e). ¹⁷
Carbon dioxide emissions	Carbon dioxide emissions or CO ₂ emissions are emissions stemming from the burning of fossil fuels and the manufacture of cement; they include carbon dioxide produced during consumption of solid, liquid, and gas fuels as well as gas flaring. Carbon dioxide (CO ₂) is a colourless, odourless and non-poisonous gas formed by combustion of carbon and in the respiration of living organisms and is considered a greenhouse gas.
Embodied carbon	Embodied carbon is the total greenhouse gas (GHG) emissions (often simplified to “carbon”) generated to produce a built asset. This includes emissions caused by extraction, manufacture/processing, transportation and assembly of every product and element in an asset. In some cases, (depending on the boundary of an assessment), it may also include the maintenance, replacement, deconstruction, disposal and end-of-life aspects of the materials and systems that make up the asset. It excludes operational emissions of the asset. ¹⁸
Operational carbon emissions	Operational carbon is the term used to describe the emissions of carbon dioxide and other global warming gases during the in-use operation of a building. Emissions arise from energy consuming activities including heating, cooling, ventilation and lighting of the building, so called ‘regulated’ emissions under Part L of the Building Regulations, and other, currently ‘unregulated’ emissions, including appliance use and small power plug loads such as IT.
Natural capital assessment	<p>A natural capital approach involves thinking of nature as an asset, or set of assets that benefit people (see figure below). The ability of natural capital assets to provide goods and services is determined by their quality, quantity and location. Understanding nature as an asset which provides flows of services to deliver benefits provides us with a framework to manage it well to deliver for society’s needs. Decision makers can more easily consider how investment in environmental assets contributes to wider societal aims and trade-offs which affect the quality or quality of assets. The framework also helps to better understand how policies can have unintended effects on the environment which result in impacts on people and businesses.</p> <p>NATURAL CAPITAL IN ACTION</p>  <p>The diagram illustrates the flow from natural capital stocks to monetary flows. It starts with 'Ecosystem or land cover type' (Woodland) leading to 'Biophysical structure or process' (Trees), which leads to 'Supporting services' (Water storage), then 'Final services' (Flow regulation), then 'Benefits' (Lower flood risk), and finally 'Values' (Reduced damage). Below this flow are three categories: 'NATURAL CAPITAL STOCKS' (Natural capital accounts), 'PHYSICAL FLOWS' (Ecosystem services assessment), and 'MONETARY FLOWS' (Ecosystem services valuation).</p>

¹⁷ <https://law.gov.wales/environment/energy-and-climate-change/Greenhousegasemissions/?lang=en#/environment/energy-and-climate-change/Greenhousegasemissions/?tab=overview&lang=en>

¹⁸ <https://www.ukgbc.org/sites/default/files/UK-GBC%20EC%20Developing%20Client%20Brief.pdf>

Biodiversity	<p>Biodiversity is defined as ‘the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part’.¹⁹ Biodiversity:</p> <ul style="list-style-type: none"> • is core to the ecological condition and quality of ecosystems that support the services and benefits provided to people • underpins the resilience of ecosystems to shocks and can provide insurance value. <p>As set out in The Dasgupta Review on the Economics of Biodiversity, a HM Treasury led review, natural capital should be actively managed and invested in like any other asset by managing the overall stock of assets and maintaining biodiversity in our portfolio of natural capital.²⁰ Because of these multiple roles, the value of biodiversity can be overlooked even in natural capital assessments.²¹</p>
<p>Net benefit for biodiversity (Wales)</p> <p>Biodiversity net gain (England)</p>	<p>Biodiversity net gains are conservation activities designed to deliver biodiversity benefits in compensation for losses in a measurable way using tools such as the Biodiversity metric 2.0. To show ‘net benefit for biodiversity’ (biodiversity net gain) developers will be required to assess potential development sites against a standardised biodiversity metric to quantify how biodiversity net gains shall be achieved. Biodiversity net gain must then be delivered through either onsite mitigation, local compensatory habitat creation or other means.</p> <p>The February 2021 update to Planning Policy Wales states: Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide <i>a net benefit for biodiversity</i>. In doing so planning authorities must also take account of and promote the resilience of ecosystems, in particular considering the diversity between and within ecosystems; the connections between and within ecosystems; the scale of ecosystems; the condition of ecosystems including their structure and functioning; and the adaptability of ecosystems.</p>

¹⁹ UN Convention on Biological Diversity

²⁰ Dasgupta, P (2021), The Economics of Biodiversity: The Dasgupta Review. HM Treasury

²¹ Department for Environment, Food & Rural Affairs (2020), Enabling a Natural Capital Approach. Part of the Green Book