

# **Research to Inform National Planning Framework 4: Planning and Climate Change Guidance**

## **Report Issue 3**

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# **Research to Inform National Planning Framework 4: Planning and Climate Change Guidance**

**Report Issue 3**

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# Quality Control

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# 1 Terminology

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1.1.1. The following definitions have been adopted for consistency. They are primarily based on the internationally recognised carbon management specification, PAS 2080:2023 Carbon Management in Buildings and Infrastructure<sup>1</sup>.

**Carbon/Carbon Emissions:** Shorthand for all greenhouse gas (GHG) emissions as defined by the Kyoto Protocol, measured in kg or tonnes of carbon dioxide equivalent (CO<sub>2</sub>e).

**Carbon Budget:** The estimated amount of whole life carbon a system can emit. These could be set at a project, sector, local or national level.

**Carbon Control:** Where project owners have the ability to manage, through direct requirement of project design and operational approach, specific objectives for capital and operational carbon emissions.

**Carbon Hotspot:** In relation to projects, an element of the project emissions that encompass high levels of carbon e.g. this could appear in a built environment project as the emissions associated with concrete usage in the project.

**Carbon Impact:** The relative significance of a development in terms of associated carbon emissions.

**Carbon Influence:** Where the project may affect carbon emissions beyond carbon control, notably through the use of project buildings or infrastructure. For example, a project owner can 'control' the carbon associated with a new road (design, construction, maintenance, lighting, etc.) but can only 'influence' the carbon emitted by users of the road.

**Carbon Mitigation:** Efforts to reduce or remove carbon emissions through the implementation of interventions, e.g. by reducing the sources of the emissions or enhancing the storage of the emissions.

**Capital Carbon:** Carbon associated with the creation, refurbishment, and end of life treatment of a project, e.g. construction materials and processes. The related term

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<sup>1</sup> [BSI Group \(2023\) PAS 2080: Carbon Management in Buildings and Infrastructure.](#)

'embodied carbon' is usually used at a product or material level, whereas capital carbon will have greater relevance at a project level.

**Net Zero Carbon:** Where the sum of the carbon emissions resulting from a project and the carbon it removes from the atmosphere equals zero. Noting that carbon savings against a 'business as usual' scenario do not necessarily represent carbon removed from the atmosphere.

**Net Zero Carbon Building:** A building with zero operational carbon emissions or negative operational carbon emissions, achieved through high energy efficiency and the possibly the deployment of renewable generation. For the purpose of this definition, the concept of a net zero carbon building comes from the World Green Building Council.

**Net Zero Test:** An iterative process of screening and assessment commensurate with influence and impact on carbon emissions.

**Operational Carbon:** Carbon associated with the operation of a project required to enable it to deliver its service or outcomes, e.g. electricity use or building heating.

**tCO<sub>2</sub>e:** The unit for measuring carbon emissions (tonnes of carbon dioxide equivalent).

**Whole Life Carbon (WLC):** The sum of carbon from all stages of the project's life cycle. For the purpose of this definition, this sum includes indirect changes in carbon expected to result from the project (decreases or increases), e.g. a reduction in atmospheric carbon or an increase in vehicular emissions (also referred to as End User carbon).

**Whole Life Carbon Assessment (WLCA):** A WLCA is the calculation and reporting of the quantity of carbon impacts expected throughout all life cycle stages of a project, but also includes an assessment of the potential benefits and loads occurring beyond the system boundary. The term is often used interchangeably with Life Cycle Assessment (LCA).



## 2 Introduction

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### 2.1 Background

- 2.1.1. In February 2023, the Scottish Government (SG) published and adopted the Fourth National Planning Framework (NPF4)<sup>2</sup>, a long-term spatial strategy including a comprehensive set of national planning policies that form part of the statutory development plan.
- 2.1.2. NPF4 represents a significant change in how the SG plans for Scotland's future by addressing the climate and nature crises directly in the planning process. Specifically, NPF4 'Policy 2 – climate mitigation and adaptation' seeks to ensure that developments act to minimise emissions and adapt to the current, and future impacts, of climate change.
- 2.1.3. Buildings and infrastructure are associated with over half the UK's greenhouse gas (GHG) emissions<sup>3</sup>. This reinforces the importance of addressing the emissions from proposed new developments across the built environment to enable a just transition towards a net zero Scotland.
- 2.1.4. NPF4 Policy 2, Part a) requires development proposals to be "*sited and designed to minimise lifecycle greenhouse gas emissions as far as possible*". "*Lifecycle greenhouse gas emissions*" is another term for 'Whole Life Carbon' (WLC), i.e. the overall carbon emissions impact resulting from a development. NPF4 therefore includes a requirement to facilitate the transition to net zero by ensuring the whole life carbon emissions impact from the built environment is assessed and minimised at the earliest stages of the planning process.

### 2.2 Report Structure

- 2.2.1. In December 2023, WSP UK Ltd were commissioned by the Building Standards Division of the Scottish Government, on behalf of the Scottish Government Planning, Architecture and
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<sup>2</sup> [Scottish Government \(2023\) National Planning Framework 4](#). (Accessed: 26 January 2024).

<sup>3</sup> [Institute of Civil Engineers \(2020\) Reducing Carbon in UK Infrastructure](#). Available at: ice-carbonproject-ig1.pdf (Accessed: 26 January 2024).

Regeneration Division, to identify relevant information sources, tools, methods, and approaches that could be used to successfully support the delivery of NPF4 Policy 2a) in the planning process. This research, undertaken between January and March 2024, will be used to inform the SG's preparation of planning and climate change guidance with a focus on proportionate, accessible, and effective tools and approaches that can be applied to minimising WLC emissions as far as possible in a wide range of development types (in accordance with the Town and Planning (Scotland) Act 1997<sup>4</sup>).

- 2.2.2. The aim of this report is to outline the initial findings from desk based research including appropriate approaches to considering whole life carbon in the development planning process. This report seeks to:
1. Outline the **methodology** taken in approach to the commission (Section 3).
  2. Provide examples of **information sources, tools, and methods and approaches** that are currently available to conduct whole life carbon assessments in the built environment (Section 4).
  3. Summarise **other current relevant standards and regulatory mechanisms** (Section 5).
  4. Provide **insight into potential future approaches** (Section 6).
  5. Summarise **how other jurisdictions are managing whole life carbon** of various development types within decision making (Section 7).
  6. Provide **feedback from key stakeholders** that are involved in various aspects of the planning process (Section 8).
  7. Provide **examples of thresholds** that could be applied to various development types by establishing the significance of carbon impact (Section 9).
  8. Summarise **key findings** for consideration and review (Section 10).

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<sup>4</sup> [UK Government \(1997\) Town and Country Planning \(Scotland\) Act 1997](#). (Accessed: 26 January 2024).

## **3 Research Methodology**

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### **3.1 Desk Based Research**

3.1.1. WSP conducted desk-based research to identify relevant information sources, tools, methods, and approaches that could be used to successfully support the delivery of NPF4 Policy 2a in the planning process. This research was not intended to be exhaustive; it aimed instead to identify example approaches to assessing and managing whole life carbon in developments.

### **3.2 Stakeholder Engagement**

3.2.1. To further develop the understanding of the approaches currently being used to assess WLC emissions of developments and to evidence a minimisation of those emissions through design, WSP conducted interviews with several key stakeholders from across the planning process. This included a variety of developers across the built environment as well as Local Authorities and planning officers.

3.2.2. WSP also conducted surveys with a range of relevant stakeholders from both sides of the planning process: one survey to those developing buildings and infrastructure and one to those assessing the WLC applications through the planning process. The survey was designed to understand common approaches to both evidencing minimisation of WLC emissions of developments as well as to assessing planning applications in line with NPF4 Policy 2a), including what information sources, tools and methods or approaches were being deployed.

3.2.3. WSP's carbon management knowledge and expertise has also been utilised to identify which of the possible tools, methods and approaches are both appropriate and may be practicably implemented to assess whole life carbon through the planning process.

3.2.4. Stakeholders engaged with in varying capacities include:

- Architecture and Design Scotland
- Cala Homes
- Federation of Master Builders
- Federation of Small Businesses

- Heads of Planning Scotland
- Homes for Scotland
- Institute of Structural Engineers
- Key Agencies Group
- Link Group
- Mobile UK
- Net Zero Carbon Buildings Standard
- Planning, Infrastructure and Place Advisory Group
- Royal Institution of Chartered Surveyors
- Royal Incorporation of Architects in Scotland
- Royal Town Planning Institute
- Scottish Futures Trust
- Scottish Government
- Scottish Land and Estates
- Scottish Planning Consultants Forum
- Scottish Renewables
- Scottish Tourism Alliance
- Scottish Property Federation
- Scottish Sea Farms
- Sustainable Scotland Network
- Wheatley Group
- Zero Waste Scotland.

## 4 Whole Life Carbon Assessment

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### 4.1 Background

- 4.1.1. NPF4 Policy 2a applies to all development proposals and requires that they will be “*sited and designed to minimise lifecycle carbon emissions as far as possible*” to aid the achievement of Scotland’s net zero future. Assessing the whole life carbon emissions of a development at the earliest stages of the planning process is crucial to enable appropriate decision making and ensure alignment with net zero policy.
- 4.1.2. This section outlines available **information sources, tools, methods, and approaches** that can be applied in the planning process to assess whole life carbon of a variety of development types. This section also provides a view as to the pros and cons of each and an indication as to which is considered best practice. It should be noted that this section is not intended to be exhaustive and includes examples of what is currently being used and could be considered best practice in Scotland and the UK.
- 4.1.3. Approaches being used as the ‘status quo’ and feedback on their relative usefulness, identified from engagement with key stakeholders with roles throughout the planning process, is summarised in Section 8 of this report.

### 4.2 Information Sources

- 4.2.1. There are several authoritative information sources that can be used to inform best practice life cycle carbon assessment. This section summarises three freely available databases which can be used to assess whole life carbon of various development types.

## DESNZ Greenhouse Gas Reporting: Conversion Factors

- 4.2.2. The Department for Energy Security and Net Zero (DESNZ) conversion factors<sup>5</sup> are a set of conversion factors that can be used by UK and international organisations to calculate carbon emissions across a wide range of activities categorised by Scope 1, 2 and 3.
- 4.2.3. The factors are divided into three sections:
- **Scope 1** (direct emissions), e.g. fuel consumption.
  - **Scope 2** (indirect energy emissions), e.g. electricity consumption.
  - **Scope 3** (indirect supply chain emissions), e.g. waste disposal, business travel, etc.
- 4.2.4. The DESNZ conversion factors are commonly used across various sectors in the UK as the database is accessible, free, and contains well developed factors that are updated annually by the UK Government. The factors relate to organisational emissions rather than whole life carbon emissions associated with a specific built asset or infrastructure activity or product. Therefore, the DESNZ database can be used to assess the **operational emissions** relevant to a specific asset only and should be used in conjunction with another database that holds factors for the other life cycle stages to provide an appropriate view of the related whole life carbon emissions.

## Inventory of Carbon and Energy Database

- 4.2.5. The Inventory of Carbon and Energy (ICE) database (Version 3)<sup>6</sup> is a comprehensive resource developed to quantify the embodied energy and carbon emissions associated with various materials and processes throughout their life cycles. It was created by researchers at the University of Bath to provide detailed and reliable data on the carbon and energy impact of a diverse range of materials and activities.

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<sup>5</sup> [DESNZ \(2023\) Greenhouse Gas Reporting: Conversion Factors 2023](https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023). Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023> (Accessed 26/01/2024).

<sup>6</sup> [Circular Ecology \(2019\) Inventory of Carbon and Energy Database](https://circularecology.com/embodied-carbon-footprint-database.html). Available at: <https://circularecology.com/embodied-carbon-footprint-database.html> (Accessed: 26 January 2024).

- 4.2.6. The database encompasses a wide range of materials, products, and processes, offering information on the energy and carbon inputs and outputs at each stage of their life cycle. It includes data from across the life cycle including related to raw material extraction, manufacturing, transportation, use, and disposal.
- 4.2.7. The ICE database is freely available and is widely utilised for life cycle assessment (LCA) studies, allowing researchers, policymakers, and industries to evaluate and compare the environmental impacts of different materials and processes. It aids in making informed decisions to reduce carbon emissions and energy consumption at the earliest stage in the development process.
- 4.2.8. Like any database, the ICE database may have limitations in terms of completeness and representativeness of data. Some specific materials or processes may not be adequately covered, and the database may require regular updates to accurately reflect the changing landscape of life cycle assessment. Additionally, effective utilisation of the database may require a certain level of expertise in life cycle assessment, potentially limiting accessibility for those without specialised knowledge.
- 4.2.9. However, the benefits of utilising the ICE database are clear given it is a comprehensive and reliable resource that can be used to assess the whole life carbon associated with materials and processes throughout their life cycles. Thus providing a reliable database that can be used to inform decision making around many types of development in the built environment.

### **Built Environment Carbon Database**

- 4.2.10. The Built Environment Carbon Database (BECD)<sup>7</sup> is a free-to-access database that launched in 2023. It was developed in partnership with organisations across the built environment with the aim to become the main source of WLC estimating and benchmarking for UK developments. The BECD collects and supplies both product-level and entity-level

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<sup>7</sup> [BCIS \(2023\) Built Environment Carbon Database](#). (Accessed: 26 January 2024).

data to the industry through its own portal, and through interacting with existing databases and software solutions.

- 4.2.11. The first section of the database contains data at entity level, provides benchmark-type data points to support the feasibility, early design, and end of life stages of project development. It is suitable for buildings and infrastructure including transport, energy systems, communications, water, waste, and ecosystem support services, and is aligned with the EN15978<sup>8</sup> and EN17472<sup>9</sup> standards. For each type of entity, users can quantify and report WLC assessed at the early design, detailed design, and post-completion project stage. Each set of carbon figures are subdivided into entity elements (e.g. structure, finishes, etc.) as well as life cycle stages. Users can generate custom benchmarks to compare their own projects against relevant benchmarks in order to assess their options and inform decision making.
- 4.2.12. The second section of the database contains data at product level to support the evolving and detailed design, construction, and operational stages of a project, according to the EN15804 standard. Classification is available by object type and enables users to generate the typical whole life carbon emissions associated with the development. Product level data allows for comparison between material options and enables the provision for reliable entity-level carbon assessments.
- 4.2.13. The BECD can be used to estimate the carbon emissions of a building or infrastructure project, and to compare the carbon impact of different materials and construction methods. It can also be used to benchmark the carbon performance of a project against industry standards. The BECD's data can be accessed through its own portal or by interacting with existing databases and software solutions. It also has an emerging asset library so would be

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<sup>8</sup> [BSI Group \(2011\) \*BS EN 15978 Sustainability of construction works\*. Available at: https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638](https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638) (Accessed: 26 January 2024).

<sup>9</sup> [BSI Group \(2022\) \*BS EN 17472 Sustainability of construction works. Calculation Methods\*. Available at: https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030408035](https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030408035) (Accessed: 26 January 2024).



useful at the very early stages of planning, for example when considering options for a specific type of building.

- 4.2.14. Due to the robustness of the approach to building the database and support from major professional institutions, the BECD is envisioned to become the main source of carbon estimating and benchmarking for the UK construction sector and a practical instrument to support the decarbonisation of the built environment as a whole.

### **Carbon Storage and Sequestration by Habitat**

- 4.2.15. It may also be necessary to estimate the carbon benefits of a development, e.g. associated with tree planting or other nature based ‘blue/green infrastructure’. In 2021, Natural England published research into carbon storage and sequestration rates of different semi-natural habitats with an indication of the range of values and associated degrees of confidence<sup>10</sup>. In the absence of a direct equivalent report in Scotland at the time of writing, it is reasonable to use the information contained within this report to estimate habitat-based carbon benefits.

## **4.3 Tools and Models**

- 4.3.1. There are several resources that can be used to assess whole life carbon emissions from infrastructure and the built environment in Scotland to inform the planning process. The focus in this section is on tools which hold carbon data and can be used to calculate carbon emissions, and models which can present scenarios and analyse the data. The paragraphs below provide further detail on several tools currently in use across the built environment, using suitably robust data to inform whole life carbon assessments. Some of the identified resources are both tools and models in that they can both calculate the carbon emissions and present scenarios and analyse the carbon data further.
- 4.3.2. Most of the identified tools/models are commercially available through a paid subscription, but some are free to use for specific users; including the RSSB Rail Carbon Tool which is free to use within the rail industry. One Click Planetary, a result of collaboration between

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<sup>10</sup> [Natural England \(2021\). Carbon Storage and Sequestration by Habitat 2021 \(NERR094\).](https://publications.naturalengland.org.uk/publication/5419124441481216)  
<https://publications.naturalengland.org.uk/publication/5419124441481216> (Accessed: 22 March 2024).

One Click LCA and partners including the UK Green Building Council, is a freely available tool for benchmarking cradle-to-gate embodied carbon. This tool is 'IMPACT' compliant which Zero Waste Scotland considers will enhance consistency and accuracy of results<sup>11</sup>.

- 4.3.3. Some tools provide the ability for users to update tool databases (e.g. SimaPro, Moata Carbon Portal, Supply Chain Sustainability School Carbon Calculator, RSSB Rail Carbon Tool and Umberto). Other tools, such as OneClick LCA and Cerclos eTool, allow users to update tool databases only with vender support with a commercial arrangement.
- 4.3.4. OneClick Planetary and OneClick LCA provide access to a global library of Environmental Project Declarations (EPD), as well as the ability to create specific EPDs for products not included in the library, which would provide useful for developers who wish to ensure the most accurate picture of their development's carbon impact. OpenLCA, Umberto, and Spera specify the ability to support the creation of EPDs but does not specify the provision of access to a library of EPDs. The Cerclos eTool provides access to a library of EPDs but does not specify the ability to support the creation of EPDs.
- 4.3.5. Other identified features include the ability to provide automated reporting and graphics, to easily inform early stage decision making and to evidence WLC emission minimisation within the planning process. OneClick Planetary, OneClick LCA, Cerclos eTool, SimaPro, RSSB Rail Carbon Tool, Umberto and Sphera all have the capability to do this type of reporting.
- 4.3.6. Additionally, several of the assessed tools can generate and compare WLCA scenarios, including OneClick Planetary, OneClick LCA, SimaPro, Umberto and Sphera. This would allow developers to inform the siting and design of development proposals to ensure WLC emissions were minimised as far as possible in alignment with NPF4 Policy 2a). Open LCA, SimaPro and RSSB Rail Carbon Too also have the capability to quantify life cycle costs.

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<sup>11</sup> [Zero Waste Scotland \(2022\). \*Regulating Embodied Carbon\*](https://cdn.zerowastescotland.org.uk/managed-downloads/mf-decg03no-1698760717d). Available at: <https://cdn.zerowastescotland.org.uk/managed-downloads/mf-decg03no-1698760717d>. (Accessed: 21 March 2024)

4.3.7. An indication as to which tools are being used most often by developers to quantify whole life carbon emissions is summarised in Section 8 of this report.

## 4.4 Methods and Approaches

4.4.1. Authoritative approaches to managing whole life carbon emissions from built environment projects within the UK are covered in this section, including an overview of best practice methods and guidance documents used to inform whole life carbon emissions assessments.

### **PAS 2080:2023 Carbon Management in Buildings and Infrastructure**

4.4.2. PAS 2080:2023<sup>12</sup> is a best practice approach for managing carbon in buildings and infrastructure. The standard covers the whole value chain of the project and aims to reduce carbon and add value through intelligent design, construction, and use. It was developed by a key group of relevant professional bodies and technical authors and is aimed for use by anyone involved in the delivery of buildings and infrastructure including:

- Infrastructure asset owners and managers
- Designers and architects
- Constructors
- Material and product suppliers
- Regulators, financiers and governments

4.4.3. PAS 2080 emphasises the importance of all parties involved across the value chain working collaboratively towards a common carbon reduction goal and the achievement of the following outcomes:

- More collaborative ways of working that promote innovation, delivering benefit to society and communities served by new buildings and economic infrastructure;

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<sup>12</sup> [BSI Group \(2023\) PAS 2080: Carbon Management in Infrastructure](https://shop.bsigroup.com/products/carbon-management-in-infrastructure/standard). Available at: <https://shop.bsigroup.com/products/carbon-management-in-infrastructure/standard> (Accessed: 26 January 2024).

- Effective carbon management in buildings and infrastructure that makes an important contribution to tackling climate change and leaves a positive legacy for future generations; and,
- The delivery of more sustainable solutions, at lower cost, that will enhance the reputation of the buildings and infrastructure industry, generating pride for those who work in it and attracting new people and skills.

- 4.4.4. PAS 2080 enables consistency in the approach stakeholders take to manage whole life carbon in buildings and infrastructure, and across supply chains, in line with the net zero carbon transition. It can be applied to asset, network, or system level programmes of work. Buildings and infrastructure providers can become PAS 2080 certified, which demonstrates adherence to industry best practice and commitment to lead sector climate action. Being PAS 2080 certified also provides a competitive advantage. Major infrastructure providers in the UK are now required to be PAS 2080 certified, which means that many of their suppliers also need to demonstrate compliance with PAS 2080 guidance.
- 4.4.5. PAS 2080 has received accolades for being the best practice approach to assess whole life carbon of developments within the built environment and is being utilised more often by developers across in the UK.
- 4.4.6. Aligning to PAS 2080 has also been signalled by government agencies in the UK. For example, in the regulated electricity industry, there is expectation from Ofgem for network operators to improve whole life carbon reporting and to align to PAS 2080 for all major infrastructure projects across the transmission and distribution networks<sup>13</sup>. Additionally, the UK Department for Transport has also mandated that all Arm's Length Bodies (e.g. Network Rail and National Highways) must assess the WLC impacts of their projects as of 2023 and encourages them to seek formal accreditation to PAS 2080. Therefore, aligning to PAS

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<sup>13</sup> [Ofgem \(2023\) RIIO-ED2 Environmental Reporting Guidance](https://www.ofgem.gov.uk/sites/default/files/2023-02/Annual%20Environmental%20Report%20-%20Guidance1676371295335.pdf). Available at: <https://www.ofgem.gov.uk/sites/default/files/2023-02/Annual%20Environmental%20Report%20-%20Guidance1676371295335.pdf> (Accessed: 26 January 2024).

2080 would ensure a consistent approach to manage whole life carbon in buildings and infrastructure in line with Scotland's net zero goals.

### **Royal Institution of Chartered Surveyors - Whole Life Carbon Assessment for the Built Environment**

- 4.4.7. The Royal Institution of Chartered Surveyors (RICS) 'Whole Life Carbon Assessment (WLCA) for the Built Environment'<sup>14</sup> standard allows for consistent and accurate carbon measurement in buildings and infrastructure throughout the built environment life cycle.
- 4.4.8. The standard enables developers to estimate carbon emissions of a constructed asset from the early development stages through to end of life. It gives visibility the carbon cost of different design options, which is a unique and useful feature of the RICS standard.
- 4.4.9. It can be used by a range of professionals in the built environment, including contractors, developers, quantity surveyors, cost consultants and building surveyors to designers, engineers and environmental, social, and governance (ESG) consultants. The standard aids decision making during the design, procurement, construction and use phases of a project, by providing WLC assessors with data to inform decision making in line with evolving national and local legislation on WLCAs.
- 4.4.10. The standard sets out a framework for conducting WLCAs, including how to determine material quantities, assumptions, scenario setting, and carbon data sources for each life cycle stage. It also provides reporting templates for buildings and infrastructure projects, which can be used to report carbon emissions from each life cycle stage.

### **Institute of Environmental Management and Assessment Guidance**

- 4.4.11. The Institute of Environmental Management & Assessment (IEMA) 'Guide for Assessing Greenhouse Gas Emissions and Evaluating their Significance'<sup>15</sup> assists carbon practitioners

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<sup>14</sup> [Royal Institution of Chartered Surveyors \(2023\) Whole Life Carbon Assessment for the Built Environment](https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment.html). Available at: <https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment.html> (Accessed: 26 January 2024).

<sup>15</sup> [Institute of Environmental Management and Assessment \(2022\) Guide for Assessing Greenhouse Gas Emissions and Evaluating their Significance, IEMA](https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions). Available at: <https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions> (Accessed: 26 January 2024).

in conducting carbon assessments, mitigation and reporting in statutory and non-statutory Environmental Impact Assessment (EIA).

- 4.4.12. The Guide sets the assessment methodology that greenhouse gas (GHG) emissions assessments within EIA should use to quantify the whole life net GHG emissions associated with proposed project and baseline scenarios. It also sets criteria for evaluating the significance of whole life carbon emissions impact.
- 4.4.13. The GHG quantification principles set out in the IEMA Guide follow other best practice standards including PAS 2080, the GHG Protocol Corporate Standard<sup>16</sup> and BS EN ISO 14064-2<sup>17</sup>.

### **Low Energy Transformation Initiative Guidance**

- 4.4.14. The Low Energy Transformation Initiative (LETI) Climate Emergency Design Guide<sup>18</sup> outlines the requirements for new buildings to ensure national climate change targets are met and to support a net zero carbon future. The guide was developed by over 100 LETI volunteers over a period of 12 months.
- 4.4.15. It is aimed at developers/landowners, designers, policy makers, and the supply chain, and provides guidance for assessing whole life carbon emissions associated with new buildings. It also aims to help to define 'good' and to set clear and achievable targets for new buildings.
- 4.4.16. The LETI guidance sets out the requirements of four key building archetypes (small scale residential, medium/large scale residential, commercial offices, and schools).

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<sup>16</sup> [Greenhouse Gas Protocol \(2015\) Corporate standard: GHG protocol](https://ghgprotocol.org/corporate-standard). Available at: <https://ghgprotocol.org/corporate-standard> (Accessed: 26 January 2024).

<sup>17</sup> [International Organization for Standardisation \(2019\) ISO 14064-2:2019](https://www.iso.org/standard/66454.html). Available at: <https://www.iso.org/standard/66454.html> (Accessed: 26 January 2024).

<sup>18</sup> [London Energy Transformation Initiative \(2020\) Climate Emergency Design Guide](https://www.leti.uk/cedg). Available at: <https://www.leti.uk/cedg> (Accessed: 26 January 2024).

4.4.17. Design teams are able to register their projects as LETI Pioneer projects, promoting the sharing of knowledge and lessons learned with other design teams assessing the aiming to reduce whole life carbon emissions associated with their projects.

### **Greater London Authority Guidance**

- 4.4.18. The 'Whole Life-Cycle Carbon Assessments Guidance'<sup>19</sup> produced by Greater London Authority (GLA) in 2022 is a comprehensive guidance document that sets out the principles for carrying out whole life carbon assessments in line with London Plan Policy SI 2 'minimising greenhouse gas emissions'. The Guidance is aimed at developers, planning applicants, designers, and local government officials.
- 4.4.19. The Guidance provides an overview of what WLC emissions are and explains how to prepare a quantitative assessment using a proposed assessment template. It also includes information on design principles and WLC benchmarks to support developers in designing low carbon projects from the outset.
- 4.4.20. WLC principles included in the Guidance reflect other best practice standards such as PAS 2080:2023 by encouraging reuse and retrofit of existing structures in the first instance, using repurposed or recycled materials, deploying low carbon alternatives, minimising operational energy and water usage, and giving consideration to circular end-of-life solutions. Additionally, it encourages efficient and regenerative design and construction methods as well as "*designing for durability and flexibility*" to reduce repair and replacement costs and emissions.
- 4.4.21. The Guidance provides a comprehensive set of steps to assess WLC and report this to GLA with instructions of what to expect for each stage of the project life cycle and how to address this within the planning process. It also outlines a specified methodology for quantification including alignment to BS EN 15978:2011<sup>20</sup> and the RICS Professional Statement and

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<sup>19</sup> [Greater London Authority \(2022\). London Plan Guidance - Whole Life Cycle Carbon Assessments.](https://www.london.gov.uk/sites/default/files/lpg_-_wlca_guidance.pdf)

Available at: [https://www.london.gov.uk/sites/default/files/lpg\\_-\\_wlca\\_guidance.pdf](https://www.london.gov.uk/sites/default/files/lpg_-_wlca_guidance.pdf). (Accessed: 21 March 2024).

<sup>20</sup> [BSI Group \(2011\) BS EN 15978 Sustainability of construction works.](https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638) Available at:

<https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638> (Accessed: 26 January 2024).

encourages the use of other relevant best practice guidance such as PAS 2080 (explored in Section 4 of this report above).

## 4.5 Guidance for Planning Officials

- 4.5.1. The information sources, tools, methods, and approaches outlined above are useful references for stakeholders across the planning and development process including developers and planning officials making decisions on individual planning applications. However, there are some guidance documents developed specifically for planning officials as explored below. It should be noted that whilst these are not Scotland specific, they can be used to inform the decision making process.
- 4.5.2. Additional guidance documents referenced by stakeholders through our engagement process (detailed in Section 8 of this report) include the Scottish City Region & Growth Deals 'Carbon Management Guidance for Projects and Programmes'<sup>21</sup> and the Moray Council 'Carbon Guidance for Planning Applications and S36 and S37 Consents'<sup>22</sup>. These are explored in more detail in Section 5 and Section 9 of this report respectively.

### Royal Town Planning Institute Guidance

- 4.5.3. The 'Climate Crisis – A Guide for Local Authorities on Planning for Climate Change' is a comprehensive guide written by the Royal Town Planning Institute and the Town and Country Planning Association. It provides an accessible introduction to the broad issues involved in planning for climate change and is designed to help planners and politicians play their full part in tackling the climate crisis.
- 4.5.4. The guide is intended to inform the preparation of development plans by local and combined authorities in the UK and provides a broad understanding of how to reduce

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<sup>21</sup> [Scottish Government \(2022\). \*Scottish City Region and Growth Deals: Carbon Management Guidance for Projects and Programmes\*](https://www.gov.scot/publications/scottish-city-region-growth-deals-carbon-management-guidance-projects-programmes/). Available at: <https://www.gov.scot/publications/scottish-city-region-growth-deals-carbon-management-guidance-projects-programmes/>. (Accessed: 26 January 2024).

<sup>22</sup> [Moray Council. \*Carbon Guidance for Planning Applications and S36 and S37 Consents\*](http://www.moray.gov.uk/downloads/file148990.pdf). Available at: <http://www.moray.gov.uk/downloads/file148990.pdf>. (Accessed: 21 March 2024).



carbon emissions while also managing climate impacts such as flooding and overheating which enables for understanding the broader climate impacts of planning decisions.

### **UK Green Building Council Whole Life Carbon Roadmap**

- 4.5.5. The UK Green Building Council's 'Net Zero Whole Life Carbon Roadmap for the Built Environment' was developed in collaboration with more than 100 organisations including the World Green Building Council and BuildingLife<sup>23</sup>. The roadmap provides a common vision with agreed actions to enable net zero through the effective whole life carbon management of buildings and infrastructure.
- 4.5.6. The roadmap is split into four key outputs:
- The **Main Trajectory Report**: Provides an overview of the project, key findings, and the steps industry must take to achieve net zero by 2050.
  - The **Technical Report**: Goes into more depth into the numbers behind the roadmap and how the team arrived at the conclusions.
  - The **Stakeholder Action Plans**: Gives clear guidance for a range of built environment stakeholders as they work to meet these targets.
  - The **Summary for Policy Makers**: Recommends the key policies government should implement to enable industry to meet these targets.
- 4.5.7. The roadmap informs assessing the significance of whole life carbon emissions of a proposal within the planning process as it provides a clear trajectory to net zero by 2050 for the built environment, setting out step-by-step actions for different stakeholders to take. It highlights a carbon budget specific to the built environment and presents a view of the specific actions and steps needed throughout the sector in order to reduce whole life carbon.

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<sup>23</sup> [UK Green Building Council \(2021\). Net Zero Whole Life Carbon Roadmap](https://ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf). Available at: <https://ukgbc.org/wp-content/uploads/2021/11/UKGBC-Whole-Life-Carbon-Roadmap-A-Pathway-to-Net-Zero.pdf>. (Accessed: 21 March 2024).

## 5 Existing Standards and Regulations

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### 5.1 Background

- 5.1.1. There are a number of standards and regulatory requirements for assessing carbon emissions, which may be relevant to different development types in Scotland. Whilst some of these requirements focus on operational carbon, NPF4 Policy 2a) requires consideration of whole life carbon and evidence of minimisation of these emissions. This section summarises current regulatory and planning mechanisms that reference carbon mitigation and highlights any associated benefits and constraints.

### 5.2 Environmental Impact Assessment

- 5.2.1. Certain development proposals require an EIA to ensure that potentially significant environmental effects are appropriately understood and opportunities to mitigate adverse effects identified. The assessment of the project's likely significant impacts on climate is a requirement of the EIA process, however determining the significance through this mechanism can be subjective and is increasingly being challenged.
- 5.2.2. For example, in 2020, the Climate X Change published a review of carbon in the EIA process<sup>24</sup> which highlights limitations with the varying methodologies and level of detail included in relation to assessing whole life carbon and carbon significance of a development. The review found inconsistencies in the approach to quantitative carbon assessments at this early stage of the project, with some based on very high-level data and others more granular data, and found that whole life carbon was often not fully assessed with end-of-life being not as well documented. However, the report recognises that there is opportunity to incorporate these elements into the EIA process especially given the increase in maturity and data availability and policy movements will ensure a focus on whole life carbon within the EIA process.

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<sup>24</sup> [ClimateXChange \(2020\). Review of Greenhouse Gas Emissions in SEA and EIA Processes](https://www.climatexchange.org.uk/wp-content/uploads/2023/09/review-of-greenhouse-gas-emissions-in-sea-and-eia-final-report-january-21.pdf). Available at: <https://www.climatexchange.org.uk/wp-content/uploads/2023/09/review-of-greenhouse-gas-emissions-in-sea-and-eia-final-report-january-21.pdf>. (Accessed: 21 March 2024).

- 5.2.3. Recently published guidance on the assessment of the significance of carbon emissions through the EIA process from the Institution of Environmental Management and Assessment<sup>25</sup> provides further clarity for addressing carbon assessment, mitigation and reporting in both statutory and non-statutory EIAs. The guidance is valuable in assessing potential alignment between the estimated emissions from proposed developments and national carbon objectives, hence its inclusion in this report.
- 5.2.4. Not all development projects are however required to submit an EIA, with required development types typically being large-scale projects only<sup>26</sup>. Therefore, there are many development types that do not have to undergo an EIA and will currently not have an assessment undertaken to identify whether delivery of the project aligns to Scotland's net zero targets. Additionally, EIA may not always be undertaken at the early design stages of a proposal, and so the critical consideration of carbon at the beginning stages of project development may have been missed. This restriction can be addressed through a wider approach to whole life carbon management, notably through PAS 2080, in which consideration of whole life carbon emissions is embedded into the earliest stages of the development process.
- 5.2.5. Strategic Environmental Assessments<sup>27</sup> are conducted at the development plan or strategy stage during which time important decisions relating to the environment are often made. At this time, however, the climate assessment can be broad and would often be a qualitative assessment highlighting potential risks and opportunities. The requirement for a quantitative and/or qualitative whole life carbon assessment to be developed early, where appropriate

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<sup>25</sup> [Institute of Environmental Management and Assessment \(2022\) \*Guide for Assessing Greenhouse Gas Emissions and Evaluating their Significance\*, IEMA](https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions). Available at: <https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions> (Accessed: 26 January 2024).

<sup>26</sup> [Scottish Government \(2017\) \*Environmental Impact Assessment\*](https://www.gov.scot/policies/environmental-assessment/environmental-impact-assessment-eia/). Available at: <https://www.gov.scot/policies/environmental-assessment/environmental-impact-assessment-eia/> (Accessed: 26 January 2024).

<sup>27</sup> [Scottish Government \(2005\) \*Strategic Environmental Assessment\*](https://www.gov.scot/policies/environmental-assessment/strategic-environmental-assessment-sea/). Available at: <https://www.gov.scot/policies/environmental-assessment/strategic-environmental-assessment-sea/> (Accessed: 26 January 2024).

and meaningful to do, so is crucial to ensure carbon mitigation opportunities are considered from the outset.

### **5.3 Net Zero Public Sector Building Standard**

- 5.3.1. The Net Zero Public Sector Buildings Standard<sup>28</sup> is a voluntary standard, developed by the Scottish Government and Scottish Futures Trust (SFT), applicable across all new or major refurbishment construction projects. Adopted in 2020, it aims to credibly align project objectives with current and forthcoming net zero policies, promoting exemplary energy and environmental practices within public sector buildings in Scotland in order to achieve net zero by 2045.
- 5.3.2. Public bodies adopting the Standard aim to enhance local communities, reduce carbon emissions and energy costs, and create healthier indoor and outdoor environments. The framework supports compliance with Scottish Government policies, providing a step-by-step approach, integrating with existing sustainability standards, and emphasising quality in design and construction. Collaboration across the public sector in Scotland is a crucial aspect of the Standard.
- 5.3.3. The Standard recognises that WLC assessments are likely to play a significant role in delivering decarbonisation across the public sector as they provide visibility to the carbon cost of design choices, enable low-carbon decisions, and assist with the management of carbon budgets. The Standard also acknowledges that a significant proportion of a building's WLC can be attributed to embodied carbon of its construction, maintenance, and end-of-life treatment, and thus the Standard calls for the assessment and reduction of these emissions.
- 5.3.4. The Standard serves as a framework for public bodies, facilitating the definition of net zero outcomes, transparent performance reporting, and the declaration of compliance at key stages in a building's life cycle.

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<sup>28</sup> [Scottish Government \(2021\) Net Zero Public Sector Buildings Standard](https://www.netzerostandard.scot/). Available at: <https://www.netzerostandard.scot/> (Accessed: 26 January 2024).

5.3.5. Supported by a comprehensive document suite, the Standard provides guidance, requirements, sector-specific guides, tools, templates, case studies, and training resources. While not a replacement for independent advice, it serves as a valuable tool for public bodies, promoting sustainability, environmental health, and net zero objectives in construction projects with the goal of delivering a net zero public sector building estate by 2045.

## 5.4 Scottish City Region and Growth Deals

5.4.1. The Scottish City Region & Growth Deals ‘Carbon Management Guidance for Projects and Programmes’<sup>29</sup> aims to provide guidance for how to manage carbon emissions associated with Scottish City Region and Growth Deal projects. The Guidance states that it “*may be considered to be an emerging form of ‘Net Zero Test’ whereby the effect of a project, policy or programme on climate change mitigation can be assessed using a proportionate, consistent and tiered approach.*”.

5.4.2. The Guidance aims to achieve effective carbon management across the Deals programme by ensuring that carbon is considered at the earliest stage of project development. It aligns with HM Treasury Green Book requirements and supports the achievement of the following key goals for all projects under the Deals:

- **Quantification** of whole life carbon using appropriate and authoritative sources;
- **Minimisation** of whole life carbon using relevant best practice methodologies; and,
- **Identification** of potential barriers to achieving net zero, e.g. skills, materials, technology.

5.4.3. A key element of this Guidance, and best practice carbon management as set out in PAS 2080, is that it is always possible to quantify whole life carbon for developments. There is a strong correlation between carbon and cost in buildings and infrastructure, therefore

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<sup>29</sup> [Scottish Government \(2022\). Scottish City Region and Growth Deals: Carbon Management Guidance for Projects and Programmes](https://www.gov.scot/publications/scottish-city-region-growth-deals-carbon-management-guidance-projects-programmes/). Available at: <https://www.gov.scot/publications/scottish-city-region-growth-deals-carbon-management-guidance-projects-programmes/>. (Accessed: 26 January 2024).

wherever it is possible to estimate cost, it is possible to estimate carbon, to the same degree of accuracy.

- 5.4.4. The Guidance was developed to be applicable for all types of development under the City Region and Growth Deal programme, from transportation infrastructure projects to net zero research facilities. Importantly, there are no development types to which the Guidance could not be applied.
- 5.4.5. The Guidance provides examples of hypothetical projects and their associated carbon emissions impact across varying project types from transport infrastructure to investment programmes. In the appendices, the Guidance includes a 'carbon checklist' for project owners and business cases reviewers to ensure the relationship between the project and a just transition to net zero in accordance with Scotland's Climate Change Plan is clearly conveyed and covers what items for inclusion in business cases including quantifiable carbon and cost assessments and the intended methodology for carbon management.
- 5.4.6. To allow an inclusive, proportionate approach to categorisation and decision making, the Guidance utilises a categorisation system that requires consideration of both the controllable carbon emissions impact of a project and the influence a project will have on emissions beyond its control boundary. This is referred to as control and influence respectively.
- 5.4.7. The approach is qualitative and includes five categories of carbon control and three categories of carbon influence:

Control:

- **Category 1:** Whole life carbon negative - the project directly results in less atmospheric carbon.
- **Category 2:** Whole life carbon net zero - the project has no measurable effect on atmospheric carbon.
- **Category 3:** Capital carbon increase then operationally net zero - the project will release carbon at the construction stage but will then stop emitting carbon in accordance with relevant net zero targets.

- **Category 4:** Capital and operational carbon increase - the project will release carbon at the construction stage then continue to emit carbon, e.g. by burning fossil fuels for heating.
- **Category 5:** Operational carbon increase - no construction is planned but the project will result in an increase in operational carbon emissions.

Influence:

- **Category A:** Carbon emissions reduction - the project leads to wider carbon savings through reduced use of fossil fuels.
- **Category B:** Negligible effect on wider carbon emissions - the project has no measurable effect on wider carbon emissions.
- **Category C:** Carbon emissions increase - the project leads to a wider carbon increase through increased use of fossil fuels.

5.4.8. An assessment of opportunities to improve the categorisation and align with Scotland's Climate Change Plan is required for those projects that fall in any of control category 4, control category 5 or influence category C. Therefore, the Guidance provides the necessary oversight and consideration of a project's carbon impact and provides advice on appropriate governance steps to take once this has been established. This ensures that there is effective carbon management across the Deals programme in line with the nation's net zero commitments.

## 5.5 Scottish Infrastructure Investment Plan

5.5.1. Scotland's Infrastructure Investment Plan 2021-2025<sup>30</sup> focuses on three core strategic themes for guiding investment decisions in Scotland:

- Enabling the **transition to net zero emissions** and environmental sustainability;
- Driving **inclusive economic growth**; and
- Building **resilient and sustainable places**.

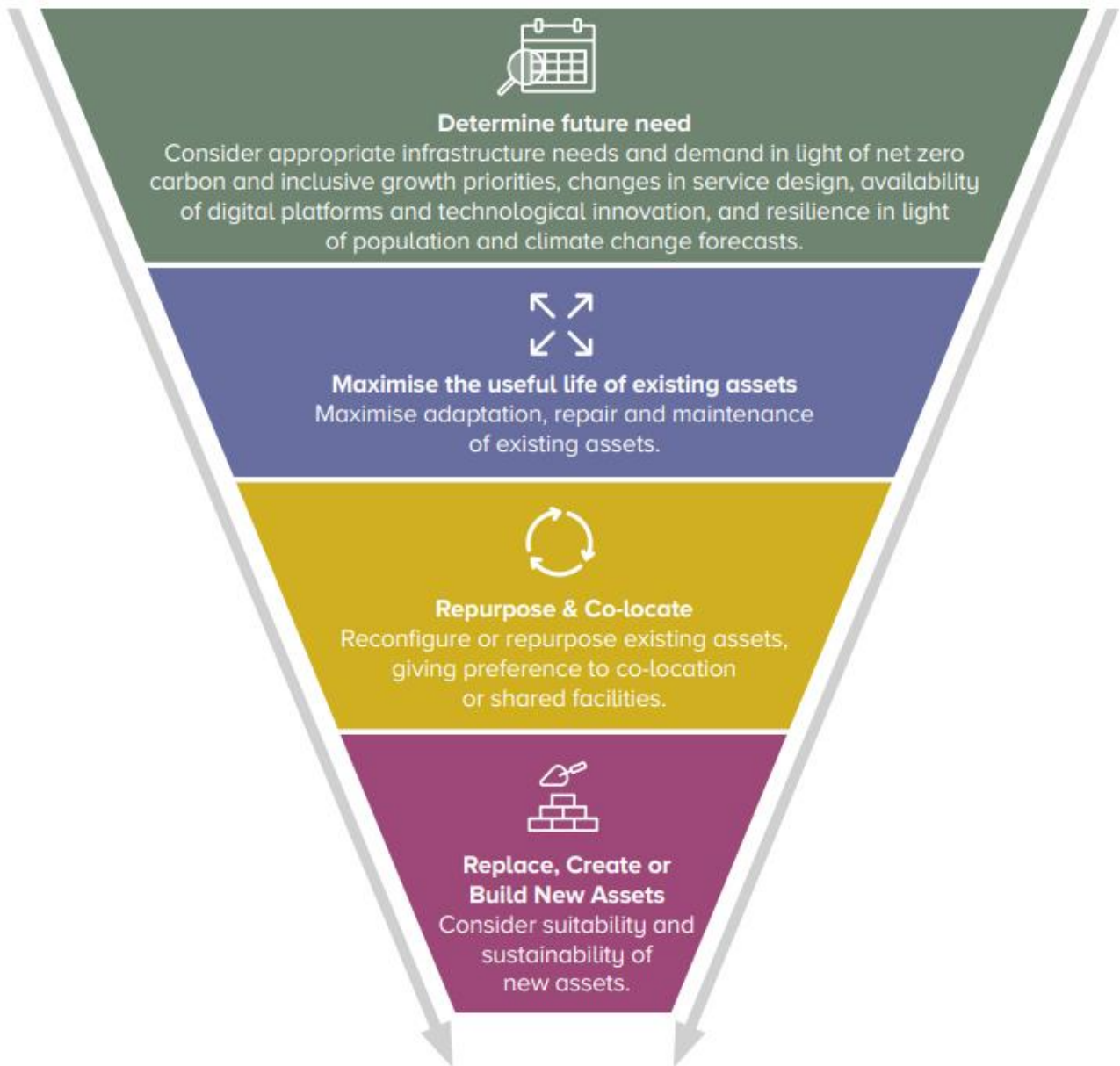
5.5.2. The plan recognises the role that infrastructure investment will have in the transition to a net zero economy and in working to end Scotland's contribution to climate change. The delivery of the plan is also supported by NPF4 as it shapes the geographic distribution of development and infrastructure.

5.5.3. The plan introduces a new investment hierarchy framework to aid planning and decision making, Figure 1 below, which prioritises enhancing and maintaining Scotland's assets over building new to reduce environmental impact and ensure value for money.

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<sup>30</sup> [Scottish Government \(2021\). A National Mission with Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26](https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/02/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/govscot%3Adocument/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26.pdf). Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/02/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/govscot%3Adocument/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26.pdf>. (Accessed: 21 March 2024).





**Figure 1: New Scottish Government Investment Hierarchy**

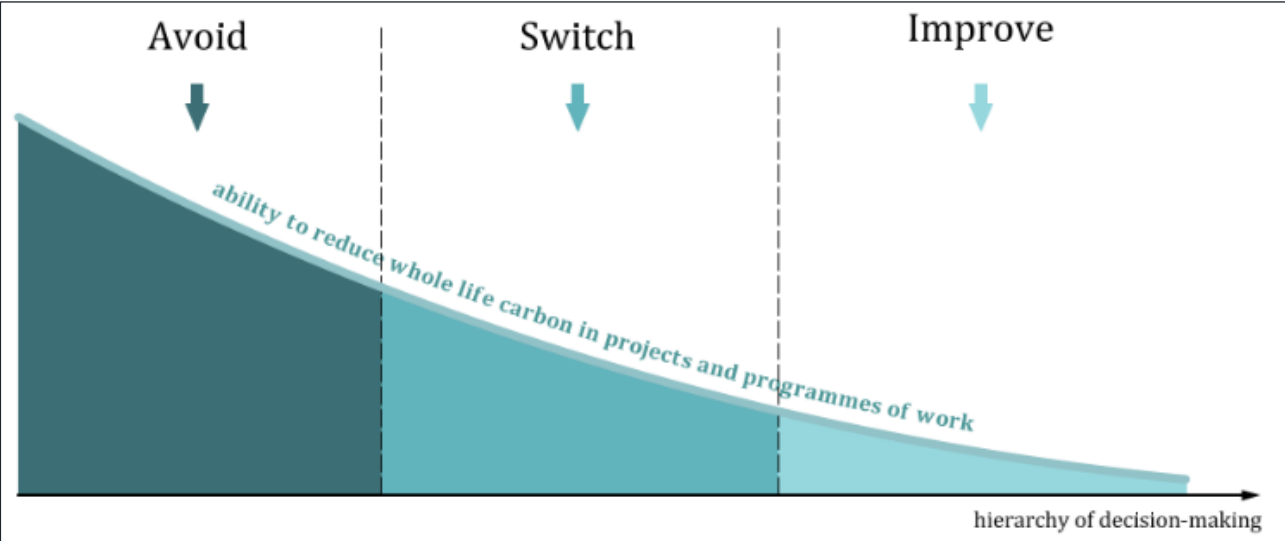
5.5.4. Aligning to the hierarchy requires that each step would need to be considered sequentially before deciding on the approach for a development. Figure 1 includes the hierarchy with the steps followed including first Determining Future Need (Determine future need Consider appropriate infrastructure needs and demand in light of net zero carbon and inclusive growth priorities, changes in service design, availability of digital platforms and technological innovation, and resilience in light of population and climate change forecasts), then Maximising the useful life of existing assets (maximise adaptation, repair and maintenance

of existing assets), then Repurposing and Co-Locating (reconfiguring or repurposing existing assets, giving preference to co-location or shared facilities) and finally Replacing, Creating or Building New Assets (consider suitability and sustainability of new assets). For example, a new development may only be built if there is a defined need, and an existing asset could not be repurposed or co-located.

5.5.5. This investment hierarchy aligns with the ‘Carbon Reduction Hierarchy’ within PAS 2080:2023: Avoid, Switch, Improve (Figure 2, below). This hierarchy ensures alignment to a net zero transition by assessing the need, deploying low-carbon solutions, and applying circular economy and nature-based solutions principles to reduce overall impact:

- **Avoid:** align the outcomes of the programme of work with the net zero transition at the system level and evaluate the basic need of the development by exploring alternative means for satisfying the need without a new construction or through reusing and repurposing existing assets.
- **Switch:** assess alternative solutions that would reduce whole life carbon emissions through initiatives such as alternative scope and design, alternative materials and technologies.
- **Improve:** identify and adopt solutions and techniques that improve the use of resources and design life of a development, including applying circular economy principles and nature-based solutions.

**Figure 2: Carbon Reduction Hierarchy, PAS 2080:2023**



5.5.6. NPF4 Policy 2a) requires appropriate siting of developments to minimise WLC emissions. Siting particularly influences transportation emissions which need to be considered when locating a project. The hierarchies within the Scottish Infrastructure Investment Plan and PAS 2080:2023 address the siting of a project or development to minimise WLC emissions by challenging the need for new infrastructure and considering design at the very earliest stages of the project life cycle, as well as encouraging appropriate siting through considering co-location and repurposing in the first instance. If followed, both hierarchies reduce overall impact including whole life carbon and other environmental impacts by repurposing in the first instance or by utilising alternative solutions across the development's life cycle.

## 6 Emerging Approaches and Standards

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### 6.1 Introduction

6.1.1. There are several emerging approaches to dealing with whole life carbon in developments. Some of these have been driven by regulators and others have been driven by proposals from the industry itself, representing the need for consistency in approach to measuring whole life carbon of the built environment. This section summarises three proposals from the industry that are being considered and highlights associated benefits and constraints, as well as three reports from Zero Waste Scotland relating to embodied carbon in the built environment.

### 6.2 Proposed Amendment to the Building Regulations – ‘Part Z’

- 6.2.1. In 2022/23, key stakeholders within the construction industry proposed the Building Regulations amendment ‘Part Z’<sup>31</sup> to the UK Parliament which outlines an industry-driven amendment to specifically address the whole life carbon of developments. Proposed Document Z outlines requirements for the assessment of whole life carbon emissions, and for the reduction of embodied carbon emissions, for all major developments.
- 6.2.2. Aligned with the RICS Professional Statement ‘Whole Life Carbon Assessment for the Built Environment’, and with guidance and recommendations made by the various relevant professional bodies, the proposal could ensure to the necessary focus on the built environment’s contribution to the Net Zero transition.
- 6.2.3. Updated in 2024, the proposal includes thresholds and would apply to developments exceeding 1000m<sup>2</sup> or involving the creation of more than 10 dwellings in alignment with the proposed size limit in the Future Homes Standard<sup>32</sup>. Whilst the Future Homes Standard is UK based, SG has committed to introducing legislation by 2024 to deliver a Scottish

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<sup>31</sup> [Part Z \(2023\) Proposed Document Z](https://part-z.uk/proposal). Available at: <https://part-z.uk/proposal> (Accessed: 26 January 2024).

<sup>32</sup> [UK Government \(2023\) Future Homes and Buildings Standard](https://www.gov.uk/government/consultations/the-future-homes-and-buildings-standards-2023-consultation/the-future-homes-and-buildings-standards-2023-consultation). Available at: <https://www.gov.uk/government/consultations/the-future-homes-and-buildings-standards-2023-consultation/the-future-homes-and-buildings-standards-2023-consultation> (Accessed: 26 January 2024).

equivalent<sup>33</sup> and the thresholds proposed in Part Z could apply to Scotland as well as the rest of the UK.

- 6.2.4. The intention behind this amendment is to normalise whole life carbon assessments within the building design process through requirements for carbon assessment to be enforced for various building types over the next few years. This gives a period during which robust carbon limits can be determined. The proposed Part Z (2) seeks to discourage excessive resource use by setting reasonable standards for upfront embodied carbon intensity and aims to empower design teams to identify opportunities to reduce a building's overall carbon impact.
- 6.2.5. Demonstrating compliance involves meeting specific criteria, including conducting a Whole Life Carbon assessment and limiting upfront embodied carbon. The implementation details cover the methodology, scope, timing, and reporting requirements for Whole Life Carbon assessments.
- 6.2.6. The proposal outlines upfront embodied carbon limits for different building typologies. These limits are expected to be periodically updated based on data collected through the government portal, reflecting evolving benchmarks and standards.
- 6.2.7. This industry-driven proposal reflects a proactive approach to address whole life carbon concerns in the building industry. By providing appropriate guidelines and standards, it aims to contribute to the built environment's essential contribution to the Net Zero transition.

### **6.3 Net Zero Carbon Building Standard**

- 6.3.1. The Net Zero Carbon Buildings Standard, the UK's first cross-industry and science-based carbon standard, is due to be published in Q2 of 2024<sup>34</sup>. Developed by leading organisations with a relevance to the built environment, the Standard can be applied in

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<sup>33</sup> [Scottish Government. \*Energy Standards Review – Scottish Passivhaus Equivalent: Working Group\*.](https://www.gov.scot/groups/energy-standards-review-scottish-passivhaus-equivalent-working-group/) Available at: <https://www.gov.scot/groups/energy-standards-review-scottish-passivhaus-equivalent-working-group/>. (Accessed: 21 March 2024).

<sup>34</sup> [UKNZCBuildings \(2023\) \*Net Zero Carbon Buildings Standard\*.](https://www.nzcbuildings.co.uk/) Available at: <https://www.nzcbuildings.co.uk/> (Accessed: 26 January 2024).

Scotland and the UK and will set out metrics by which net zero carbon performance is evaluated in a single agreed methodology. It will incorporate performance targets and limits that have been derived from an analysis of the UK's Sixth Carbon Budget, in line with a 1.5°C trajectory, and from data gathered across different sectors within the built environment.

- 6.3.2. The Standard is for anyone involved in the development process through from investment and design to contractors and developers, as well as suppliers and manufacturers. It is also aimed at those who wish to be involved with any aspect of developing a 'Net Zero Carbon Building' or demonstrate that their building is Net Zero Carbon (NZC) in accordance with an industry-agreed standard.
- 6.3.3. Two key principles for the Standard are that it should be stretching but achievable, and that it should be science-based. To reconcile these aims, two workstreams have been established to develop appropriate NZC limits. The bottom-up workstream will use benchmarking, case studies, and modelling to understand levels of performance. The top-down workstream will establish the relevant national carbon budgets which show what the industry needs to achieve to play its part in a NZC UK. The outputs from these workstreams will then be combined to create NZC limits and targets for various building types.
- 6.3.4. Therefore, the Standard aims to provide a clear and consistent methodology that will enable industry to robustly prove that their built assets are Net Zero Carbon in line with the UK's climate targets and a 1.5°C trajectory.

## **6.4 Climate Emergency Response Group – Net Zero Test**

- 6.4.1. NPF4 Policy 2 ensures that developments and projects are in line with net zero and appropriately address the climate crisis. In August of 2023, the Climate Emergency Response Group (CERG) released briefing papers detailing proposals for immediate action on four priority issues to deliver the required action to address the climate emergency in Scotland<sup>35</sup>. A group of leaders from Scotland's private and public sector as well as delivery

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<sup>35</sup> [Climate Emergency Response Group \(2023\) CERG Briefing Papers](https://cerg.scot/briefing-papers/). Available at: <https://cerg.scot/briefing-papers/> (Accessed: 26 January 2024).

organisations and membership bodies, the group aims to inform and influence the Scottish Government's response to the climate emergency by providing practical advice and solutions that can be implemented now. One of the four priorities in the 2023 briefing papers was the introduction of a mandatory 'net zero test' to inform all policy and investment decisions.

6.4.2. The paper details the proposed introduction of a consistent carbon assessment process for all capital projects and programmes with clear accountability procedures through the following core mechanisms:

- **Screening:** A qualitative screening approach would be applied to determine whether the project/policy has a positive or negative carbon emissions impact. This then informs the next stage for quantitative assessments in a tiered approach, e.g. if the projects are not aligned with a net zero trajectory, then they would be examined further under the next mechanisms.
- **Detailed assessment:** A detailed and quantitative carbon assessment would be applied to the relevant capital projects, policy assessments, or major investment programmes to determine quantitative emissions modelling.
- **Guidance and governance:** Steps to ensure transparency and effective reporting and monitoring would be carried out including the publication of the screening and carbon emissions assessment. The governance roles of appropriate checkers and owners are also outlined to ensure a robust process.

6.4.3. In the paper, CERG notes that several organisations including the UK Climate Change Commission and the Institute for Government have already called for a net zero test to ensure that all government decisions are compatible with meeting carbon budgets and, ultimately, net zero. Additionally, CERG notes that net zero tests have been adopted by other jurisdictions including New Zealand and France and encourages taking learnings from these to inform the approach in Scotland.

6.4.4. The CERG notes several opportunities that would arise from the introduction of a net zero test:

- **Developing a consistent approach to carbon assessment** by; building on carbon assessment approaches and guidance already in use by the Scottish Government; aligning with the UK treasury Green Book guidance to quantify whole life carbon

emissions and consider the cost of carbon in the economic analysis; and supporting the adoption and integration of existing best practice standards such as PAS 2080.

- **Informing policy decisions** by; supporting delivery of NPF4 and associated climate policy priorities with the need for quantitative carbon assessments by providing a mechanism to integrate and deliver the policies; supporting future Climate Change Plan commitments such as more quantitative account view of how policies contribute to sectoral emissions; forming part of an effective governance framework to support the implantation of a Climate Change Plan; and supporting the government's commitment to ensure public sector spending delivers wide benefits including a net zero transition.
- **Informing spending decisions** by; supporting the implementation of the SG's commitment to further develop the carbon assessment approach for the next Infrastructure Investment Plan<sup>36</sup>; and evidencing carbon cost management and the "value for money" of climate policies and programmes.
- **Flagging climate risks and just transition opportunities** by; signposting projects that would benefit from further consideration in terms of futureproofing for climate impacts and securing a just transition.

6.4.5. CERG suggests that the introduction of a net zero test early in the planning process to input into business case development will help to inform decisions ahead of the procurement stage, at which best-practice standards such as PAS 2080 can be applied. Thus ensuring that appropriate consideration to carbon management is seen across the project life cycle. The CERG believes that measurable action against this proposal is essential to both meet the national climate targets and give businesses, investors, and citizens the clarity they need.

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<sup>36</sup> [Scottish Government \(2021\) \*A national mission with local impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26\*](https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/pages/11/). Available at: <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/pages/11/> (Accessed: 26 January 2024).



- 6.4.6. Whilst CERG have referred to a 'test', this is essentially an assessment mechanism to ensure a project's alignment to net zero. This could be in the form of a whole life carbon assessment aligned with NPF4 Policy 2a).

## 6.5 Zero Waste Scotland Reports

- 6.5.1. In recent years, Zero Waste Scotland has developed several reports discussing the relationship between the built environment and embodied carbon<sup>37</sup>. Two of these reports are explored below.

### Embodied Carbon in the UK

- 6.5.2. The report 'Embodied Carbon: Status Quo and Suggested Routemap'<sup>38</sup> is a state-of-play assessment allowing Zero Waste Scotland to explore and understand the current state of embodied carbon and the direction of travel for the construction industry. The report provides context on embodied carbon including metrics, assessment tools, data gaps and mitigation options, and provides a view on industry perspectives. It also includes a roadmap with actions for Zero Waste Scotland to accelerate progress towards managing and reducing embodied carbon.
- 6.5.3. The report recognises the significance of embodied carbon emissions in the built environment and highlights the need for appropriate regulation, which is further explored in the second report as outlined below. Additionally, the report details action in the absence of regulation such as Zero Waste Scotland's involvement in developing the 'Net Zero Public Sector Building Standard' which is discussed in Section 5 of this report.

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<sup>37</sup> [Zero Waste Scotland \(2022\). \*Built Environment and Embodied Carbon\*](https://www.zerowastescotland.org.uk/resources/built-environment-embodied-carbon). Available at: <https://www.zerowastescotland.org.uk/resources/built-environment-embodied-carbon>. (Accessed: 21 March 2024).

<sup>38</sup> [Zero Waste Scotland \(2022\). \*Embodied Carbon - Status Quo and Suggested Steps\*](https://cdn.zerowastescotland.org.uk/managed-downloads/mf-x0da4o-r-1698760616d). Available at: <https://cdn.zerowastescotland.org.uk/managed-downloads/mf-x0da4o-r-1698760616d>. (Accessed: 21 March 2024).

## Regulating Embodied Carbon in Scotland

- 6.5.4. Zero Waste Scotland published the report ‘Regulating Embodied Carbon in Scotland’s Buildings’<sup>39</sup> in 2022, highlighting the significance of embodied carbon in the built environment and discusses regulation initiatives from around the world to inform lessons for the development of associated regulation in Scotland.
- 6.5.5. The report discusses the increasing significance of embodied carbon emissions of buildings, stating that emissions from the Scottish construction sector (a major proportion of the building’s whole life carbon emissions) have amounted to between “4 and 5MtCO<sub>2</sub>e per year” which is reported to be around 10% of the annual quantity of Scotland’s total carbon emissions. Due to this significance, and without action, these construction-related emissions would take an increasing share of Scotland’s carbon budget.
- 6.5.6. The report then discusses opportunities for regulating embodied carbon in Scotland, primarily suggesting it would be likely to be regulated through building regulations which already regulate operational carbon emissions. Zero Waste Scotland suggests that a mandatory embodied or whole life carbon assessment could be included into Section 7 of the Building Standards, and this would align with other jurisdictions’ approach to regulating whole life carbon (for example as seen in Europe, further discussed in Section 7 of this report).
- 6.5.7. Zero Waste Scotland reference relevant initiatives and policy development such as the Net Zero Public Sector Buildings Standard and the City Region and Growth Deals, explored in Section 5 of this report. They also reference the Climate Change Committee’s 2021 recommendation to the Scottish Government<sup>40</sup> to move towards minimum whole life carbon standards for all buildings, advising that a plan is needed “for phasing in mandatory whole

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<sup>39</sup> [Zero Waste Scotland \(2022\). Regulation Embodied Carbon in Scotland’s Buildings](https://cdn.zerowastescotland.org.uk/managed-downloads/mf-rgz8wha4-1698760774d). Available at: <https://cdn.zerowastescotland.org.uk/managed-downloads/mf-rgz8wha4-1698760774d>. (Accessed: 21 March 2024)

<sup>40</sup> [Climate Change Committee Progress in reducing emissions in Scotland - 2021 Report to Parliament](https://www.theccc.org.uk/publication/progress-reducingemissions-in-scotland-2021-report-to-parliament/) Available online: <https://www.theccc.org.uk/publication/progress-reducingemissions-in-scotland-2021-report-to-parliament/>. (Accessed 20<sup>th</sup> March 2024)

*life reporting following by minimum whole life standards for all buildings, roads, and infrastructure by 2025*".

- 6.5.8. Additionally, it references the Scotland's Climate Assembly's 2021 recommendations for action<sup>41</sup> which include the implementation of "*clear and future-proofed quality standards for assessing the carbon impacts of all buildings public and private using EnerPhit/Passivhaus standards (as a minimum) and integrating whole life carbon costs, environmental impact and operational carbon emissions*".
- 6.5.9. The report discusses UK based guidance and approaches such as LETI, RIBA, RICs, and also discusses the industry led proposal Part Z both explored in Sections 4 and 6 of this report. It also explores the international landscape, referencing European directives and initiatives as seen in jurisdictions such as Finland, Denmark, and Sweden. These are discussed in Section 7 of this report.
- 6.5.10. The report then explores opportunities for regulation in Scotland. It discusses important questions to be addressed such as what, when, and how to regulate, including the need to include thresholds and parameters for significance. It also provides a routemap to regulation including milestones of when to report whole life carbon emissions and the imposition of thresholds and limits. It should be noted that this routemap is less ambitious than other emerging approaches such as the industry proposed Part Z and the CERG net zero test. Given NPF4 has been in place since 2023, the proposed NPF4: Planning and Climate Change Guidance will enable a welcome acceleration to managing whole life carbon in the planning process.

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<sup>41</sup> [Scotland's Climate Assembly \(2021\). Recommendations for Action](https://www.climateassembly.scot/full-report). Available at: <https://www.climateassembly.scot/full-report>. (Accessed: 29 Feb 2024).

## 7 Approaches Beyond Scotland

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### 7.1 Background

- 7.1.1. To successfully achieve Scotland's net zero targets, a consolidated effort is required across parties from the planning and design stages of a development proposal to the construction stage. Embedding climate considerations within decision making processes will be key to ensuring that carbon emissions are considered early and that all parties involved on a development scheme are aware of the requirements to be met.
- 7.1.2. Many regions and countries are considering how to best embed carbon and climate considerations within planning. The following section summarises examples of how other jurisdictions are seeking to embed carbon assessment and mitigation within the planning process by introducing policy and thresholds relevant to a wide range of projects and developments.

### 7.2 Sweden

- 7.2.1. Since the start of January 2022, the Swedish Act on Climate Declarations for New Buildings (2021:787)<sup>42</sup> requires developers to produce a 'climate declaration' for buildings. The declaration is essentially a carbon quantification exercise which sets out the carbon impact of the entire construction phase for life cycle stages A1-5 including raw material supply, transport, product manufacture and the actual construction work<sup>43</sup>. The climate declaration therefore ensures that developers are starting to report carbon emissions associated with their developments. However, there is also a need to actively reduce these carbon emissions to ensure compliance with net zero targets.

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<sup>42</sup> [Swedish Government \(2021\) Act \(2021:787\) on climate statement for buildings](https://leap.unep.org/en/countries/se/national-legislation/act-2021787-climate-statement-buildings). Available at: <https://leap.unep.org/en/countries/se/national-legislation/act-2021787-climate-statement-buildings> (Accessed: 26 January 2024).

<sup>43</sup> [BSI Group \(2011\) BS EN 15978 Sustainability of construction works](https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638). Available at: <https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638> (Accessed: 26 January 2024).

- 7.2.2. In May 2023, Boverket (the Swedish National Board of Housing, Building and Planning) published a paper entitled *Limit Values for Climate Impact from Buildings and an Expanded Climate Declaration*<sup>44</sup> as a proposal for amending this act. This paper set out the introduction of ‘limit values’ – or carbon targets – representing maximum levels for the climate impact of buildings and recommends the introduction to be as early as 2025. These encompass the life cycle stage A1-5 aligned with the act 2021:787. This proposal would mean that buildings would have to perform better than a carbon limit prescribed per building type (measured by amount of carbon dioxide equivalent per metre squared of the gross floor area (GFA)).
- 7.2.3. Boverket’s paper then suggests that with time, the scope of assessment is increased, and the carbon targets are made more ambitious. The paper suggests that from 2027, the scope should be expanded to cover the entire WLC of the building through construction, operation and use, and end of life (life cycle stages A1-5, B2, B4, B6, and C1-4 as within BS EN 15978). This is assumed to be in line with future regulations from the European Union from 2027. At the same time, limit values would be reduced and would continue to do so every five years. The first reduction would require a 25% carbon reduction by 2030 compared to the limits introduced in 2025.
- 7.2.4. It is worth noting that that is not the first case like this within Scandinavia. Denmark have introduced climate declarations and limit values in recent years aligned with their 2018 Building Regulations<sup>45</sup>. Whilst these introductions are specifically within their building regulations, these can be a means of harmonising the wider developmental approach to net zero by managing and reducing impacts such as carbon in alignment with national objectives and policy such as planning policy.
- 7.2.5. Denmark followed a similar pathway to Sweden, first introducing climate declarations and then – from the start of 2023 – introducing carbon limit values. Where Sweden’s approach

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<sup>44</sup> [Boverket \(2023\) \*Limit values for climate impact from buildings and an expanded climate\*](https://www.boverket.se/en/start/publications/publications/2023/limit-values-for-climate-impact-from-buildings/). Available at: <https://www.boverket.se/en/start/publications/publications/2023/limit-values-for-climate-impact-from-buildings/> (Accessed: 26 January 2024).

<sup>45</sup> [Danish Government \(2018\) \*Building regulations 2018 \(BR18\)\*](https://www.iea.org/policies/2511-building-regulations-2018-br18). Available at: <https://www.iea.org/policies/2511-building-regulations-2018-br18> (Accessed: 26 January 2024).

looks at carbon emissions per square metre of GFA, Denmark's thresholds are given per metre squared of GFA per year (kgCO<sub>2</sub>e/m<sup>2</sup>/yr) with an assumed building lifetime of 50-years. Finland is not currently as advanced but has been following a similar route with the introduction of climate declarations and limit values set to start in 2025.

- 7.2.6. As highlighted above, the positioning paper developed by Boverket is being written as a proposal for amending the Act on Climate Declaration for Buildings. Having liaised with stakeholders within Sweden on this amendment, it seems that at a national level the current appetite for this change is not there. However, greater ambition is being shown at a local and municipal level. For example, Stockholm have set targets to reduce emissions between 2020 and 2030 by 50% in relation to land allocation and housebuilding. Gothenburg are even more ambitious with a 50% reduction target in A1-5 emissions by 2025 and 90% reduction by 2030.
- 7.2.7. The difference in limit values, or reduction targets, at national and local levels could make it difficult for developers to fully understand what is required for their developments and, as such, ensuring alignment at a national level would better inform requirements. This was a point also made by a UK developer who stated that varying requirements by Local Authorities made it difficult for them to plan a consistent approach to developments across the UK.

### **7.3 Ireland**

- 7.3.1. In 2021, Ireland amended the Climate Action and Low Carbon Development Act 2021<sup>46</sup>, adding the requirement for Local Authorities to develop Climate Action Plans (CAP). Local Authority CAPs further enhance local authorities' ability to lead, engage, coordinate, and become agents of change in response to the ongoing climate change crisis. They also represent a new opportunity to embed climate mitigation in local authority spatial planning.

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<sup>46</sup> [Irish Government \(2021\) Climate Action and Low Carbon Development Act 2021](https://www.irishstatutebook.ie/eli/2021/act/32/enacted/en/html). Available at: <https://www.irishstatutebook.ie/eli/2021/act/32/enacted/en/html> (Accessed: 26 January 2024).

- 7.3.2. Following this amendment, the Office of the Planning Register (OPR) published a case study paper entitled *Climate Action and the Local Authority Development Plan*<sup>47</sup>. The paper offers insight into the challenges that local authorities currently experience in terms of incorporating climate mitigation into development plans and highlights exemplary aspects of existing development plans that include climate mitigation measures.
- 7.3.3. To date, local authorities within Ireland have made considerable progress in accounting for their internal carbon footprint, in implementing energy efficiency improvements in public buildings, and in developing climate adaptation plans. However, they have made limited progress beyond their internal carbon footprint. The new statutory requirement in the 2021 Climate Action Act, allied to the pre-existing planning legislation climate provisions, presents an opportunity to strengthen local authority climate mitigation planning and development to improve coordination between local authorities ensuring emissions reduction targets are met.
- 7.3.4. Under Ireland's 2021 Climate Action Act, the role of the local authority has been significantly expanded. Successful delivery of the role will require sufficient supports and resources to develop plans, engage with stakeholders and co-ordinate with adjoining local authorities. A framework has been created which is split into 3 key areas:
- **Direct Responsibility:** For example, the Council's own emissions.
  - **Indirect Responsibility:** For example, granting planning permission.
  - **Championing:** For example, leveraging influence through extended reach of authority and supporting implementation that falls outside of the planning system.
- 7.3.5. To support this, recommendations are given to how to align to climate mitigation to planning. These are as follows:
- **Show ambition;**
  - **Outline clear pathways** and specific measures to achieve results;
  - **Seek innovative ways** to extend influence across different domains and sectors;

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<sup>47</sup> OPR (2022) *OPR Case Study Paper CSP05 - Climate Action and the Local Authority Development Plan*. (Accessed: 26 January 2024).

- **Monitor climate action measures;** and
- **Integrate climate action** throughout the development plan.

- 7.3.6. Key elements from these recommendations are the ability to measure and monitor actions taken against climate change. Within the paper, several examples are discussed where requirements are set for developments over a certain size, however, carbon reporting or the implementation of reduction targets is not explicitly described.
- 7.3.7. Another key action from the Climate Action and Low Carbon Development Act is the need to develop baseline emission inventories (BEIs) at a Local Authority level. However, the OPR's paper highlights challenges with developing baselines at local levels given the baseline information at a national level is out of date and carbon modelling tools are onerous to replicate at a local level. There is also limited data sources to measure the impact of objectives within the CAPs. The paper highlights the need to bridge the gap between national and local objectives to reduce carbon emissions as currently the messaging is broad and offers insufficient direction. From engagement with stakeholders in Sweden and in the UK, it is clear that a more coherent message at both a national and local level is required.
- 7.3.8. To counter these challenges, OPR recommend that a broader evidence base is created to provide a baseline for how developments align to climate objectives and policies. Other recommendations described include the implementation of quantifiable carbon targets so that reductions from a baseline can be set and measured against.

## **7.4 New Zealand**

- 7.4.1. In 2020, the New Zealand Government declared a climate change emergency and committed to a carbon-neutral government by 2025. The motion to declare such an emergency recognised the “alarming trend in species decline and global biodiversity”, including the indigenous biodiversity of Aotearoa (New Zealand).
- 7.4.2. New Zealand ratified the Paris Agreement in 2016 and committed Aotearoa to reducing greenhouse gas emissions by 30% by 2030 from a 2005 baseline via its Nationally



Determined Contribution (NDC)<sup>48</sup>. The national government recognises its leadership role in conservations and has committed to influencing action on the NDC through leading by example.

7.4.3. New Zealand instilled its commitments into law through the introduction of the Zero Carbon Act 2019<sup>49</sup>, which provides a framework by which Aotearoa can develop and implement clear and stable climate change policies. Four key things were introduced through this framework:

- A new domestic greenhouse gas emissions reduction target for New Zealand.
- The establishment of a new system of emissions budgets to act as stepping stones towards the long-term target.
- The requirement for the Government to develop and implement policies for climate change adaptation and mitigation.
- The establishment of a new, independent Climate Change Commission to provide expert advice and monitoring to help keep successive governments on track to meeting long-term goals.

7.4.4. As well as this, a requirement to conduct a Climate Implications of Policy Assessment (CIPA) was introduced in 2019. This CIPA requires central government agencies to undertake and report on the carbon emissions implications for all policy proposals that go to Cabinet and meet the following criteria:

- An objective of the policy proposal is to decrease GHG emissions.
- The impact on GHG emissions is likely to be equal or above 0.5 million tonnes carbon dioxide equivalent (CO<sub>2</sub>e) within the first ten years of the proposal period (representing an annual average of 50,000 tonnes)

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<sup>48</sup> [UNFCC \(ND\) Nationally Determined Contributions](https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs). Available at: <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs> (Accessed: 26 January 2024).

<sup>49</sup> [Ministry for the Environment \(2019\) Climate change response \(Zero carbon\) amendment act 2019](https://environment.govt.nz/acts-and-regulations/acts/climate-change-response-amendment-act-2019/). Available at: <https://environment.govt.nz/acts-and-regulations/acts/climate-change-response-amendment-act-2019/> (Accessed: 26 January 2024).

- For forestry-related proposals, the impact on GHG emissions is likely to be equal or above 3 million tonnes of CO<sub>2</sub>e within the first 30 years of the proposal period (representing an annual average of 100,000 tonnes).

7.4.5. The purpose of the requirement is to enable New Zealand to measure, monitor, and report on Cabinet decisions that will have an impact on Aotearoa's carbon emissions. The mechanism covers a wide variety of development types and ensures that Ministers are aware of the implications a policy decision may have for New Zealand's future carbon emissions. The process is set up to ensure early engagement with the Ministry for the Environment in the policy process and ultimately supports the transition to a net zero economy effectively through the form of a 'Net Zero Test' alike the CERG proposal.

## 7.5 Greater London Authority

7.5.1. One example of carbon being considered in UK developments can be seen from Greater London Authority's (GLA) introduction of the Carbon Offset Fund<sup>50</sup> in 2018. Although not described as a tax, this could be seen as a form of carbon taxation and applies to new major developments through the planning process.

7.5.2. As part of the planning process, developers must provide:

- A calculation of any carbon shortfall (the 'residual emissions' that will be produced by the development after carbon minimisation through design and construction has been applied); and
- A commitment stating that any shortfall identified will be met off-site; and
- Confirmation of the offsetting approach which will be taken, i.e. payment into a carbon offset fund, or an off-site project if this has been agreed with the local authority.

7.5.3. Therefore, developers must reduce the predicted operational carbon emissions from developments as far as possible, with remaining emissions taxed at £95 per tCO<sub>2</sub>e over a

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<sup>50</sup> [Greater London Authority \(2018\) Carbon Offset Funds](https://www.london.gov.uk/sites/default/files/carbon_offset_funds_guidance_2018.pdf). Available at: [https://www.london.gov.uk/sites/default/files/carbon\\_offset\\_funds\\_guidance\\_2018.pdf](https://www.london.gov.uk/sites/default/files/carbon_offset_funds_guidance_2018.pdf) (Accessed: 26 January 2024).

30-year period, equating to a total contribution of £2,850/tCO<sub>2e</sub>. The revenue from this process, which has recently been extended to all major developments, is then used to fund carbon reduction projects across London.

- 7.5.4. The GLA's offset fund carbon price was originally set at £60/tCO<sub>2e</sub> over a 30-year period, based on the "*nationally recognised non-traded price of carbon...and the Zero Carbon Hub price*"<sup>51</sup>. However, this was raised to £95/tCO<sub>2e</sub> following a viability assessment, which allowed individual local authorities to set their own carbon offset prices through the same mechanism. For example, Lewisham Council adopted a price of £104/tCO<sub>2e</sub> after examining types of offsetting measures that could be funded and the expected shortfall of different development types against a range of policy scenarios.
- 7.5.5. This requirement forces the consistent assessment of carbon in proposed developments and incentivises lower carbon solutions by applying a price to carbon emissions arising as the result of new developments.

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<sup>51</sup> [AECOM \(2017\) London Carbon Offset Price](https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf). Available at: [https://www.london.gov.uk/sites/default/files/london\\_carbon\\_offset\\_price\\_-\\_aecom\\_.pdf](https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf) (Accessed 26 January 2024)

## 8 Feedback from Key Stakeholders

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### 8.1 Introduction

8.1.1. WSP have engaged with key stakeholders from all sides of the planning process through targeted engagement and more wide reaching engagement through a survey to ensure a broad range of stakeholder feedback was gained. Stakeholders included developers, Local Authorities and planning officers, and relevant Government bodies. This section explores some pertinent feedback gained through this engagement, highlighting some common approaches used as well as any challenges experienced in relation to assessing whole life carbon in the planning process.

#### Survey Methodology

- 8.1.2. In March 2024, WSP issued surveys to a range of relevant stakeholders from both sides of the planning process including developers and decision makers such as planning officials and Local Authority officers (outlined in section 3.2.4.). The survey was designed to understand common approaches to both evidencing minimisation of WLC emissions of developments as well as to assessing planning applications in line with NPF4 Policy 2a), including what information sources, tools and methods or approaches were being deployed.
- 8.1.3. The survey was issued via MS Forms and compiled a series of 14 questions considering the types of developments the respondents were involved in, their experience of conducting or assessing WLC assessments, and which information sources, tools and models, or methods and approaches they used to do so. The survey also invited respondents to rank these in terms of their usefulness and relative ease of use and indicate what was best practice in the industry. There was also a question specifically related to what should be included in any guidance document for satisfying NPF4 Policy 2a). A total of 21 responses were received from a range of stakeholders such as Local Authorities, central Government and/or Agencies, and housing developers, with around 85% of respondents being 'decision makers' and around 15% being developers.
- 8.1.4. Pertinent feedback from the survey responses is explored below.

## 8.2 Survey Responses

### Survey Responses

- 8.2.1. The majority of respondents with a role in decision making were from a Planning Authority with roles across Development Planning, Development Management, consultees to the planning process, as well as and other roles such as ‘influencing policy’. Some decision makers also responded from central government and / or agencies. The respondents were involved in developments across the designated categories with around 72% involved in Local and Major Developments, in Major Developments, and around 56% involved in National Developments in some capacity. Respondents indicated their involvement in a variety of types of developments such as housing, electricity generation, transport and infrastructure, and minerals.
- 8.2.2. Once the types of roles and types of developments covered by the respondents was identified, questions focused on whole life carbon assessments and evidencing WLC emissions minimisation in planning applications. Only 50% of decision maker respondents had themselves reviewed evidence of WLC emissions minimisation in planning applications with only 6% stating they regularly review these as part of the application process, though this may be reflective of the range of differing roles represented amongst respondents.
- 8.2.3. Few respondents had direct experience of using information sources specifically designed to provide guidance to decision makers: 59% had never used guidance such as the Town and Country Planning Association’s ‘The Climate Crisis: A Guide for Local Authorities on Planning for Climate Change’<sup>52</sup> or the UK Green Building Council’s ‘Net Zero Whole Life Carbon Roadmap’<sup>53</sup> (these are explored further in Section 4 of this report for reference).
- 8.2.4. However, respondents did reference other useful guidance documents such as the Scottish Government Growth Deal Carbon Guidance (see further details in Section 5 of this report). The Moray Council ‘Carbon Guidance for Planning Applications and S36 and S37

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<sup>52</sup> [Town and Country Planning Association \(2023\)](https://www.tcpa.org.uk/wp-content/uploads/2021/11/TCPA-RTPI-Climate-Guide-4th-edition-1.pdf). Available at: <https://www.tcpa.org.uk/wp-content/uploads/2021/11/TCPA-RTPI-Climate-Guide-4th-edition-1.pdf>. (Accessed: 21 March 2024).

<sup>53</sup> [UK Green Building Council \(2021\). Net Zero Whole Life Carbon Roadmap](https://ukgbc.org/our-work/topics/whole-life-carbon-roadmap/). Available at: <https://ukgbc.org/our-work/topics/whole-life-carbon-roadmap/>. (Accessed: 21 March 2024).

Consents<sup>54</sup> was also referenced as being particularly useful given it was created and adopted specifically to support the development management process in line with NPF4 Policy 2. Other information sources or guidance documents also referenced by respondents include the RICS 'Whole Life Carbon Assessment for the Built Environment'<sup>55</sup>, the ICE Database<sup>56</sup>, and the LETI guidance<sup>57</sup>, all of which are explored in Section 4 of this report.

- 8.2.5. One decision maker recognised their lack of resourcing which proved challenging in assessing evidence of WLC emissions minimisation. The respondent described the need for a “*clear nationally required methodology*” which did not differ from local authority guidance to ensure a consistent approach and to reduce fatigue on planning officials.
- 8.2.6. Subsequent questions explored the decision maker’s experience of various tools and methods or approaches used by developers to evidence minimisation of WLC emissions in planning applications. 80% of respondents had not seen any of the suggested tools (such as OneClick LCA and OpenLCA) and models being used by developers. However, respondents suggested that other tools may be utilised such as manual calculations in MS Excel using the DESNZ or ICE emissions factors, explored in Section 4 of this report, and the Scottish Government’s Carbon Calculator<sup>58</sup> for wind farms. Limitations with this calculator were recognised by a respondent in that it “*does not account for all stages of the development*” so cannot be representative of WLC emissions. Another respondent

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<sup>54</sup> [Moray Council. Carbon Guidance for Planning Applications and S36 and S37 Consents.](http://www.moray.gov.uk/downloads/file148990.pdf) Available at: <http://www.moray.gov.uk/downloads/file148990.pdf>. (Accessed: 21 March 2024).

<sup>55</sup> [Royal Institution of Chartered Surveyors \(2023\) Whole Life Carbon Assessment for the Built Environment.](https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment.html) Available at: <https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment.html> (Accessed: 26 January 2024).

<sup>56</sup> [Circular Ecology \(2019\) Inventory of Carbon and Energy Database.](https://circularecology.com/embodied-carbon-footprint-database.html) Available at: <https://circularecology.com/embodied-carbon-footprint-database.html> (Accessed: 26 January 2024).

<sup>57</sup> [London Energy Transformation Initiative \(2020\) Climate Emergency Design Guide.](https://www.leti.uk/cedg) Available at: <https://www.leti.uk/cedg> (Accessed: 26 January 2024).

<sup>58</sup> [Scottish Government. Carbon Calculator Tool.](https://informatics.sepa.org.uk/CarbonCalculator/) Available at: <https://informatics.sepa.org.uk/CarbonCalculator/>. (Accessed 21 March 2024).

suggested that they recommend tools that follow BS EN 15978:2011 standard<sup>59</sup> such as OneClick LCA, eTool and CarboniCa.

- 8.2.7. The majority of decision maker respondents (62.5%) had also not reviewed applications that had referenced the utilisation of best practice methodology/approaches such as PAS 2080:2023 or the RICS guidance as explored in Section 4 of this report. Many respondents indicated that they had little experience of best practice approaches to evidencing a minimisation of WLC emissions due to their own lack of training and resources, with one stating “*we are making a best stab at what we think is appropriate*”. However, some respondents indicated best practice examples include those following the Scottish City Region & Growth Deals and the Moray Council Carbon Guidance (see further details in Section 5 and Section 9 of this report) and those using detailed site specific assessments and those with complete data sets to ensure comprehensive assessment and reporting.
- 8.2.8. Survey respondents from the development sector included those with an involvement in Local, Major, and National Developments and in sectors such as housing, electricity generation, transport and infrastructure and other development types. Respondents provided information on their approach to conducting whole life carbon assessments, suggesting that calculations could be done without a tool and instead using MS Excel in combination with best practice methodologies and standards to inform their approach such as PAS 2080:2023, the IEMA guidance, the RICS guidance, and the Net Zero Public Sector Buildings Standard (further explored in Section 4 of this report).
- 8.2.9. Respondents from the development sector also rated the Built Environment Carbon Database and the ICE Database as useful information sources/toolkits to conduct WLC assessments given these are best practice emissions source databases (as further explored in Section 4 of this report).
- 8.2.10. Constructive feedback was received from both the ‘decision maker’ and developer respondents relating to the proposed NPF4: Planning and Climate Change Guidance.

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<sup>59</sup> [BSI Group \(2011\) BS EN 15978 Sustainability of construction works](https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638). Available at: <https://landingpage.bsigroup.com/LandingPage/Undated?UPI=000000000030256638> (Accessed: 26 January 2024).

Several responses indicating any guidance should be “*simple*”, “*straightforward*” and “*consistent*” to enable consistency in approach and reduce fatigue for those on either side of the planning process. Suggestions included guidance containing a checklist that both decision makers and developers can use to easily highlight areas of compliance in order to reduce complexity, and the inclusion of guidance for each stage of the project WLC for the development in terms of what should be considered to minimise whole life carbon in line with NPF4 Policy 2a).

- 8.2.11. Additional feedback was received around ensuring proportionality and providing guidance around both assessing planning applications in terms of the weighting attributed to Policy 2a) compared to other policies in NPF4, and in terms of balancing other development considerations such as safety, cost, and the supply chain. Respondents also referenced the need to define the wording in NPF4 Policy 2a) specifically related to what satisfies minimising WLC emissions “*as far as possible*” for varying development types within any guidance.
- 8.2.12. Finally, feedback was received questioning how the planning system interacts with the building regulations in terms of the approach to managing carbon. For example, it has been questioned whether whole life carbon quantification and assessment should sit solely within the planning system and whether in some cases it should also be considered within the building regulations given the technical nature of carbon quantification, as operational carbon is currently considered. Whether the use of mechanisms such as planning conditions would ensure best practice whole life carbon management and considering how this would overlap with the building regulations was also raised.



## Conclusion

- 8.2.13. The survey issued invited views on a range of best practice information sources, tools, and methodologies and their relative usefulness in conducting or assessing WLC assessments for developments in Scotland. It gained insight into which information sources, tools, and methods have been used by those involved in either side of the planning process, as well as providing insight into the needs of decision makers to inform preparation of the NPF4: Planning and Climate Change Guidance.
- 8.2.14. From the respondents with a 'decision making' role, only 50% had reviewed a WLC assessment or evidence of WLC emissions minimisation in the planning process, although this could be representative of the particular roles of the respondents and the type of application they are involved in. Several respondents highlighted a **lack of training and resourcing** to enable them to effectively assess evidence of lifecycle emissions minimisation in planning applicants.
- 8.2.15. Decision makers suggested that the Scottish Government Growth Deal Carbon Guidance and The Moray Council 'Carbon Guidance for Planning Applications and S36 and S37 Consents' (see further details in Section 5 and 9 of this report respectively) are particularly useful resources supporting the development management process in alignment with Scotland's net zero ambitions. Developers suggested that PAS 2080:2023 was a particularly useful guidance document in the process of carbon management and the Built Environment Carbon Database and the ICE Database were useful toolkits in conducting WLC assessments.
- 8.2.16. Decision makers invited any guidance document for NPF4 Policy 2a) to be **accessible and simple**. Suggestions included guidance containing a checklist that both decision makers and developers can use to easily highlight areas of compliance or non-compliance, and the inclusion of guidance for each stage of the project WLC.

Developers also recognised that **clear and straightforward guidance** for satisfying NPF4 Policy 2a) would be essential to ensure a consistent approach. Additional feedback was received around ensuring proportionality and providing guidance around both assessing planning applications in terms of the weighting attributed to Policy 2a) compared to other policies in NPF4, and in terms of balancing other development considerations such as safety, cost, and the supply chain.

## 9 Assessment and Quantification Thresholds

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### 9.1 Background

- 9.1.1. The assessment and management of WLC, as with all environmental impacts, should be proportionate. However, a proportionate approach requires an understanding of the likely magnitude of WLC resulting from a proposed development.
- 9.1.2. The Scottish Government's City & Regional Growth Deals Carbon Management Guidance includes the following WLC estimation requirement, stemming from the UK Treasury Green Book:
- 9.1.3. *"The whole life carbon emissions impact from all proposed programmes, policies and projects should be assessed and quantified, e.g. in tonnes of carbon dioxide equivalent. The level of detail will increase from Strategic to Full Business Case, however carbon estimation is expected at all stages (whenever cost can be estimated, so can carbon to a similar degree of accuracy)"<sup>60</sup>;*
- 9.1.4. Although it is possible to estimate the carbon emissions likely to result from any kind of development at the earliest stages, it is reasonable to recognise there could be a threshold below which such emissions may not require to be quantified and reported through the planning process.
- 9.1.5. This section includes reference to three approaches to proportionate carbon assessment relevant to the planning process.

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<sup>60</sup> [Scottish Government \(2022\). Scottish City Region and Growth Deals: Carbon Management Guidance for Projects and Programmes](https://www.gov.scot/publications/scottish-city-region-growth-deals-carbon-management-guidance-projects-programmes/). Available at: <https://www.gov.scot/publications/scottish-city-region-growth-deals-carbon-management-guidance-projects-programmes/>. (Accessed: 26 January 2024).

## 9.2 Embodied Carbon

- 9.2.1. In January 2024, a Policy Position Paper signed by several industry bodies (including the UK Green Building Council, the Institution of Structural Engineers, RICs and the Institute of Civil Engineers, amongst others) was sent to UK political party leaders called for the regulation of WLC emissions in the UK.
- 9.2.2. The paper outlines that despite the significance of embodied carbon emissions, they are unregulated in the UK and legislation to regulate these emissions has successfully been implemented in countries in the UK and further afield, as outlined in Section 7 of this report.
- 9.2.3. The signatories outline two milestones; one suggesting the introduction of legal limits on the upfront embodied carbon emissions and a second as below:
- 9.2.4. **By 2026:** Mandating the measurement and reporting of whole life carbon emissions for all projects with a **gross internal area of more than 1000m<sup>2</sup> or that create more than 10 dwellings**. Essentially, this paper is suggesting a minimum threshold for calculating the WLC impact of building developments of a gross internal area of more than 1000m<sup>2</sup> or developments that create more than 10 dwellings. This positioning paper aligns with both the CERG proposal for a 'Net Zero Test' and the Proposed Document Z as a proposed amendment to the Building Regulations, both of which consider the need for specific thresholds as described in more detail in Section 6. It also aligns with The UK Green Building Council's 'Net Zero Whole Life Carbon Roadmap for the Built Environment – Summary for Policy Makers' as explored in Section 4 of this report.

### 9.3 Moray Council Carbon Guidance for Planning Applications

- 9.3.1. The Moray Council ‘Carbon Guidance for Planning Applications and S36 and S37 Consents’<sup>61</sup> provides guidelines to support the development management process in determining planning applications. The Guidance is aligned with NPF4 Policy 2a) and 2b) by ensuring developments meet the need of current and future climate scenarios and have given consideration to whole life carbon management.
- 9.3.2. The Guidance requires a quantitative whole life carbon assessment to be carried out for development where certain thresholds have been met or exceeded and encourages alignment with a “*nationally recognised assessment method*”. It also requires a carbon management and reporting plan, a carbon sequestration statement, a renewable energy and heat decarbonisation statement, and ‘barriers to net zero’ statement. The document provides detailed questions and requirements under each of these sections to ensure that the development proposals are sited and designed to minimise WLC emissions as far as possible and adapt to current and future risks from climate change in line with NPF4 Policy 2.
- 9.3.3. The Guidance applies thresholds for which these requirements should be included in the application. The thresholds where the Guidance applies are:
- Residential developments of **10 or more units**.
  - Commercial, industrial, retail, leisure, infrastructure developments where floor space is **1,000 square meters or more**.
  - Energy-related developments of **5MW or more**.
- 9.3.4. For developments above these thresholds, evidence of a quantitative whole life carbon assessment and carbon management plan along with statements outlined above is required. These thresholds align with the policy positioning paper outlined in Section 8.2

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<sup>61</sup> [Moray Council. Carbon Guidance for Planning Applications and S36 and S37 Consents](http://www.moray.gov.uk/downloads/file148990.pdf). Available at: <http://www.moray.gov.uk/downloads/file148990.pdf>. (Accessed: 21 March 2024).

above and provide additional thresholds for developments in the energy industry which would encompass Scottish onshore and offshore wind developments for example.

## **9.4 Greater London Authority Whole Life Carbon Benchmarks**

- 9.4.1. Within the Greater London Authority's 'Whole Life Cycle Carbon Assessments' guidance document, benchmarks for a variety of building development types are included to inform planning applicants as they proceed through the planning process.
- 9.4.2. The whole life carbon (WLC) benchmarks are recommended to be used as a guide for all applicants that are developing projects such as offices, residential developments, educational facilities, and retail developments. The benchmarks provide a range of WLC emissions in kilograms of carbon dioxide equivalent per metre squared ( $\text{kgCO}_2\text{e/m}^2$ ) and are broken down into lifecycle stages. They also include a percentage breakdown of a typical development for each lifecycle stage.
- 9.4.3. Projects with WLC emissions higher than the benchmarks are required to "*carefully examine how they can reduce WLC emissions*" and the assessment template, providing within the Guidance to be used by applicants in the planning process, provides space for applicants to explain any variance and steps they have taken to mitigate WLC.
- 9.4.4. As well as this benchmark, an 'aspirational' WLC benchmark has been set for each development type and lifecycle stage. These stretching benchmarks are based upon a 40 per cent reduction in WLC emissions from the first set of benchmarks, in line with the World Green Building Council's target to achieve a 40 per cent reduction in WLC emissions by 2030<sup>62</sup>. Applicants are encouraged to consider how they can achieve WLC reductions in line with the aspirational benchmarks and document this within the planning process.

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<sup>62</sup> [World Green Building Council. \*New Report: the Building and Construction Sector can Reach Net Zero Carbon Emissions by 2050\*](https://worldgbc.org/article/new-report-the-building-and-construction-sector-can-reach-net-zero-carbon-emissions-by-2050/). Available at: <https://worldgbc.org/article/new-report-the-building-and-construction-sector-can-reach-net-zero-carbon-emissions-by-2050/>. (Accessed: 21 March 2024).

## 9.5 Institute of Environmental Management and Assessment Guidance

- 9.5.1. In Section 4 of this report, the Institute of Environmental Management & Assessment (IEMA) 'Guide for Assessing Greenhouse Gas Emissions and Evaluating their Significance' is explored. This guidance document sets criteria for evaluating the significance of whole life carbon emissions impact.
- 9.5.2. The Guidance emphasises that all carbon emissions are significant and encourages contextualising a project's carbon impact against pre-determined carbon budgets for example:
- **Sector-based** carbon budgets;
  - **Local** carbon budgets; and
  - **National** carbon budgets.
- 9.5.3. The Guidance explores examples of various projects and how they would consider the significance of their carbon impact. It also sets out principles for assessment including all material direct and indirect emissions which are defined by magnitude.
- 9.5.4. IEMA include an exclusion threshold for significance in Section 5.3 of the Guidance, as follows:
- Activities that do not significantly change the result of the assessment can be excluded where **expected emissions are less than 1% of total emissions**, and where all such exclusions total a maximum of 5% of total emissions.
- 9.5.5. This guidance can be interpreted as to where a proportion of WLC emissions (for example construction related or end-of-life emissions) is less than 1% of the total carbon emissions impact of a project, positive or negative, the proportion could be scoped out of an assessment. However, this exclusion threshold is purposefully low to ensure significant emissions are included in any assessments.
- 9.5.6. IEMA's approach to carbon quantification and assessment is similar to that proposed by CERG in the form of a 'net zero test', as explored in Section 6 of this report.

## 9.6 Thresholds for Infrastructure Developments

- 9.6.1. It should be noted that the Policy Positioning Paper in Section 9.2 above is specifically targeted to buildings and due consideration must be given to applying a similar threshold approach to other infrastructure developments.
- 9.6.2. PAS 2080:2023 sets out guidance for estimating and managing whole life carbon but it is not prescriptive regarding thresholds for carbon assessment. Metrics are starting to be used by infrastructure professionals that could be applied to a wider range of infrastructure projects, such as a kgCO<sub>2</sub>e per metre of linear infrastructure (e.g. electricity network, rail, pipeline, etc), although these metrics are currently not widely adopted.
- 9.6.3. However, it is possible to interpolate a broad threshold value from the buildings embodied carbon policy paper and the Moray Council approaches described above as an indicator of a scale of carbon emissions below which quantification may not be proportionate. The threshold value of 1000m<sup>2</sup> is used in both instances, i.e. whole life carbon (including embodied carbon) should be assessed for developments larger than this threshold.
- 9.6.4. The Low Energy Transformation Initiative (LETI) Climate Emergency Design Guide<sup>63</sup> (further explored in Section 4 of this report) was produced in 2021 by a network of over 1,000 built environment professionals, comprising developers, engineers, housing associations, architects, planners, academics, sustainability professionals, contractors, and facilities managers. It included an 'Embodied Carbon Primer' that set out a range of carbon targets for buildings, based on improvements on 'business as usual'. Embodied carbon values for business as usual (in 2021) ranged from 800kg/m<sup>2</sup> for residential developments to 1000kg/m<sup>2</sup> for Commercial developments.
- 9.6.5. This information may be used to infer that the threshold of 1000m<sup>2</sup> included in the Moray Council guidance and the Embodied Carbon Position Paper relates to an embodied carbon value of around 800,000kg to 1,000,000kg of carbon dioxide equivalent, i.e. 800 to 1000 tonnes of carbon dioxide equivalent. This may be a logical starting point for the

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<sup>63</sup> [London Energy Transformation Initiative \(2020\) Climate Emergency Design Guide](https://www.leti.uk/cedg). Available at: <https://www.leti.uk/cedg> (Accessed: 26 January 2024).

development of a threshold above which formal whole life carbon assessment and management could be required to satisfy NPF4's climate change mitigation requirements.

9.6.6. To provide some context, the following development types would result in the release of at least approximately 1,000 tCO<sub>2</sub>e of embodied carbon<sup>64</sup>. These proxies should not be regarded as definitive and they are only provided to assist in conceptualising the scale of developments and potential WLC emissions:

- 1,000 m<sup>2</sup> commercial building;
- 0.5 km of dual carriageway;
- 0.5 km of ballasted railway track; or
- 10km of a stepped one-way cycle lane.

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<sup>64</sup> These are estimates based on data available in suitably authoritative sources such as the [LETI Embodied Carbon Primer](#), the [DecarboN8 reports on the embodied carbon of roads](#) and railways, and [CESMM4](#). Available at: <https://www.leti.uk/ecp> (Accessed: 9 May 2024); <https://decarbon8.org.uk/EmbodiedEmissions-road/> (Accessed: 9 May 2024); <https://decarbon8.org.uk/EmbodiedEmissions-rail/> (Accessed: 9 May 2024); <https://www.icevirtuallibrary.com/doi/book/10.1680/cesmm.57517> (Accessed: 9 May 2024)



# 10 Findings

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## 10.1 Introduction

10.1.1. WSP was commissioned to identify relevant information sources, tools, methods, and approaches that could be used to successfully support the delivery of NPF4 Policy 2a in the planning process. Through this research, best practice methodologies and approaches to whole life carbon assessments of developments in the UK were identified as well as appropriate tools to undertake this analysis, and approaches taken from other jurisdictions in Europe and further afield. Additionally, current relevant standards and regulations were identified, and insights into relevant regulatory proposals were also gathered. This section summarises the key findings of this research.

## 10.2 Information Sources, Tools, Methods & Approaches

- 10.2.1. From WSP's desk-based research, stakeholder engagement, and WSP's experience conducting whole life carbon assessments in various sectors in the built environment, it is clear that **appropriate information sources, tools and methodologies for assessing whole life carbon already exist and are being used** by industry.
- 10.2.2. Best practice methodologies, outlined in Section 4, such as PAS 2080:2023 and the RICS WLCA are being used frequently in the built environment to approach the assessment of whole life carbon in various development types. Strong signalling from the industry itself and from government agencies to adhere to a common best practice approach has become more apparent in recent years. For example, National Highways, a major UK infrastructure public body, has become accredited to the standard and Ofgem has required transmission and distribution network operators to align to PAS 2080 and provide annual reports on the whole life carbon emissions of their developments to the regulator.
- 10.2.3. As outlined in Section 4 and Section 8, there are several tools available to conduct whole life carbon assessments and several which are currently being utilised by the industry and professional organisations, such as OneClick Planetary which is free to use and is accessible on a global scale. There are also emerging asset libraries, such as the BECD and ICE databases, which are freely accessible and inform the associated WLC emissions for a whole host of product and entity-level assets. These enable accessible and best

practice whole life carbon assessments by providing the necessary building blocks to ensure carbon is considered at the very earliest stages of project development.

### 10.3 Relevant and Emerging Regulations and Policy

- 10.3.1. NPF4 Policy 2a) requires appropriate siting of developments to minimise WLC emissions. Existing standards such as the Scottish Infrastructure Investment Plan and PAS 2080:2023 include hierarchies which address the siting of a project or development to minimise WLC emissions by **challenging the need and considering the design at the very earliest stages of the project life cycle**, as well as encouraging appropriate siting through considering co-location and repurposing in the first instance. If followed, both hierarchies reduce overall impact including whole life carbon and other environmental impacts by repurposing in the first instance by utilising alternative solutions across the development's life cycle.
- 10.3.2. As well as NPF4, there are other relevant regulatory and policy requirements that seek to consider carbon in the development process, e.g. EIAs and the Scottish City & Regional Growth Deals guidance. There is opportunity to ensure consistency and encourage a focus on whole life carbon management given the increase in maturity across the development sector and the planning process and the increase in data availability.
- 10.3.3. Whilst recognising that planning encompasses a wide range of industries and sectors, some members of the development industry are acting to pave the way for a more consistent approach to assessing whole life carbon and considering carbon mitigation early in the project life cycle. This can be seen from the industry led proposals outlined in Section 6, such as proposed Part Z to the Building Regulations and the CERG Briefing Paper, which aim to provide a cohesive methodology and appropriate standards to inform WLC assessment and carbon mitigation in the built environment across various development types.
- 10.3.4. The CERG Briefing Paper, calling for a 'net zero test', sets out an assessment of significance during early stage business case development to inform decisions ahead of the procurement stage. This is essentially an assessment mechanism to ensure a project's alignment to net zero, which could be in the form of a whole life carbon assessment directly aligned with NPF4 Policy 2a).

## 10.4 Lessons from International Approaches

- 10.4.1. The case studies in Section 7 of this report show the positive steps that are being introduced to ensure that carbon and climate considerations are made during the planning stage of developments. There are some key considerations that come out of these which could be adopted and taken forward in Scotland.
- 10.4.2. Ensuring that carbon is measured and quantified on relevant development projects, such as the climate declarations required within Sweden's planning process, is a crucial first step. **Before consideration can be given to reducing emissions it is key that there is a consistent approach to measuring emissions and setting carbon baselines.** Following this, measures can be taken to set carbon targets or budgets, and from there plans can be made to set reduction targets. Taking each opportunity at a time enables developers to understand the requirements and make plans for how to cost effectively ensure that developments align to national and local net zero targets.
- 10.4.3. The paper by Boverket raises issues that need to be considered and addressed around cost, skills, and data. Firstly, there is a recognition that there will be a cost associated with this as developers will need to collect and collate information on their schemes, and Boverket who will need to employ people who can check and verify the results. The cost of low-carbon materials to meet carbon targets could also potentially increase costs. They estimate that the costs of development could increase by 1-5% as a result. Secondly, the paper points out the need to upskill people to be able to conduct carbon assessments and knowledgeably embed low-carbon opportunities within developments. Finally, there is a need to ensure consistency between projects and developments to enable projects to be assessed on a like-for-like basis. To do this, Boverket recognise that digitalisation is needed to make things as simple as possible and have been developing a tool and database for developers to use to ensure this consistent approach.

- 10.4.4. For building developments within the UK there are already guidelines on carbon baselines and future targets for buildings given in kgCO<sub>2</sub>e/m<sup>2</sup>). LETI<sup>65</sup> and RIBA<sup>66</sup> have set benchmarks for different building types and projected what good and exemplary practice would be in the future. Although these are not legally binding it provides a good starting point on where the industry sees the direction of travel. Standardised tools are also being developed, for example the Future Homes Hub<sup>67</sup> are currently developing a tool which could be used to ensure a consistent approach to quantification and measurement going forward.
- 10.4.5. A key point to raise from the Scandinavian examples discussed in Section 7 is that they are only relevant for building developments. To ensure that all development proposals that fall under NPF4 are considering ways to minimise carbon emissions, providing appropriate guidance to infrastructure projects should be considered. Whilst there is a straightforward metric for buildings, for example kilograms of carbon dioxide equivalent per metre squared, this is not the case when looking at infrastructure projects as they differ so greatly. Metrics that could be used could be total emissions per spend, however, cost volatility could lead to large differences year-on-year. Linear infrastructure projects could use a metric of carbon emissions per linear metre, but other infrastructure projects and development types may not be able to use the same approach.
- 10.4.6. Additionally, within Ireland, many case study examples related to buildings and modal shifts between vehicle choices, specifically energy performance during operation and the use of renewables and electric vehicles. There is a need to ensure that whole life carbon, including life cycle stages A1-5, is considered through planning to ensure that the impacts of land use, materials, and construction all form part of the decision-making process.
- 10.4.7. Greater London Authority's approach to enforce the reduction of the operational carbon emissions from developments could be an effective way to ensure major developments are aligned with net zero by prescribing a cost to any unaddressed carbon. Finally, New Zealand's approach to ensure that the carbon impact of policy decisions is included in the

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<sup>65</sup> [LETI. Carbon Alignment](https://www.leti.uk/carbonalignment). Available at: <https://www.leti.uk/carbonalignment>. (Accessed 22 February 2024).

<sup>66</sup> [RIBA. 2030 Climate Challenge](https://www.architecture.com/about/policy/climate-action/2030-climate-challenge). Available at: <https://www.architecture.com/about/policy/climate-action/2030-climate-challenge>. (Accessed: 22 February 2024).

<sup>67</sup> [Future Homes Hub](https://www.futurehomes.org.uk/). Available at: <https://www.futurehomes.org.uk/>. (Accessed 22 February 2024).

appraisal process is a great step to ensure that the true implications of policy decision making are considered at an early stage in the process to ensure alignment with their net zero ambitions.

## 10.5 Stakeholder Engagement

10.5.1. WSP engaged with key stakeholders from all sides of the planning process through targeted engagement and more wide reaching engagement through a survey to ensure a range of stakeholder feedback was gained. Stakeholders included developers, Local Authorities and planning officers, and relevant agencies.

10.5.2. After analysing feedback received, some pertinent and common themes can be recognised:

1. There is a lack of **resourcing and capability** within the current landscape across Local Authorities and planning officials. Therefore, to build internal capability and ensure that there is good understanding, there is a need to consider the specific skills, capacity, and understanding across the planning system. This would ensure consistency in the planning process across various development types.
2. There is a varying degree of maturity across both sides of the planning process in terms of the approach to managing and minimising whole life carbon. However, **best practice approaches** such as PAS 2080:2023 are being used successfully.
3. There is overwhelming support for a **simple and easy-to-use guidance** document such as the proposed NPF4: Planning and Climate Change Guidance. The request to ensure guidance is proportionate and accessible **can** be met by SG.

## 10.6 Assessment and Quantification Thresholds

10.6.1. Whilst it is possible to quantify the carbon likely to result from any kind of development (as the Scottish City & Regional Growth Deal Guidance points out: “*whenever cost can be estimated, so can carbon to a similar degree of accuracy*”) it is also reasonable to recognise there should be a threshold below which WLC emissions may not require to be quantified and reported through the planning process.

10.6.2. The January 2024 Policy Position Paper signed by several industry bodies (including the UK Green Building Council, the Institution of Structural Engineers, RICs and the Institute of Civil

Engineers, amongst others) included a proposed threshold for developments of a “**gross internal area of more than 1000m<sup>2</sup> or that create more than 10 dwellings**” at which mandatory quantitative whole life carbon assessments would need to be conducted.

- 10.6.3. The Moray Council Guidance also includes the same thresholds for developments and stipulates a third threshold for energy generation projects of **5MW or more**. Developments over these thresholds must conduct a quantitative whole life carbon assessment and evidence a carbon management and reporting plan, as well as including a carbon sequestration statement, a renewable energy and heat decarbonisation statement, and ‘barriers to net zero’ statement.
- 10.6.4. From the thresholds outlined in the positioning paper and the Moray Council Guidance, and the LETI Climate Emergency Design Guide, it is possible to interpolate a broad threshold value as an indicator of a scale of carbon emissions below which quantification may not be proportionate. From these, it could be inferred that the threshold of 1000m<sup>2</sup> relates to an embodied carbon value of around **800 to 1000 tonnes of carbon dioxide equivalent**. This is a logical starting point for the development of a threshold above which formal whole life carbon assessment and management could be required to satisfy NPF4’s climate change mitigation requirements.
- 10.6.5. The Institute of Environmental Management and Assessment (IEMA) guidance, explored in Section 4 and 9 of this report, emphasise the significance of all carbon emissions and encourages contextualisation of a project’s carbon impact against pre-determined carbon budgets. It also includes guidance for exclusion thresholds; where a proportion of lifecycle emissions is less than 1% of the total carbon emissions impact of a project then the proportion could be scoped out of a quantitative assessment. However, this exclusion threshold is purposefully low to ensure significant emissions are included in any assessments.
- 10.6.6. The positioning paper, the Moray Council Guidance, and the IEMA guidance align with both the CERG proposal for a ‘Net Zero Test’ and the Proposed Document Z as a proposed amendment to the Building Regulations, both of which are described in detail in Section 6 of this report.

## 10.7 Key Findings Summary

Three summary key findings in relation to assessing and minimising WLC emissions in the planning process have been determined through this research and stakeholder engagement. Consideration to each of these would further ensure that whole life carbon is considered and addressed early in the planning process thus informing decision making and ensuring that development proposals align with NPF4 Policy 2a).

1. **Appropriate and best practice tools and methodologies for assessing WLC already exist and are already being used:**
  - a. Despite there being an evolving landscape in terms of assessing WLC emissions (e.g. the increasing provision of Environmental Product Declarations), and varying degrees of maturity in terms of the approach to assessing whole life carbon in the built environment, **appropriate and best practice tools for measuring whole life carbon emissions already exist and are already being used in the development sector**. Best practice methodologies are also already being used (e.g. PAS 2080 is widely used and is already a requirement for some infrastructure companies by their government regulators).
2. **Stakeholders on both sides of the planning process want clear guidance and a consistent approach:**
  - a. It is clear from the stakeholder feedback that **simple, accessible and consistent guidance is required** to ensure best practice standards are upheld across the planning process. It is also clear from industry led proposals such as Part Z, the CERG Briefing Papers, that the **key stakeholders in the built environment itself want WLC to be addressed**.
3. **The Scottish Government can level the playing field:**
  - a. There are several best practice and appropriate standards and methodologies that exist and are already being utilised. The SG is well placed to level the playing field in the planning process by **providing clear guidance and signalling which accounting methodologies and approaches are considered best practice**.

- b. Lessons learnt from international case studies show that providing appropriate guidance **ensures consistency and is a key first step to the sector driving down emissions** in line with Scotland's net zero goals.





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