Landscape and Carbon

A report for the UK landscape sector published by the British Association of Landscape Industries and the Landscape Institute.

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The British Association of Landscape Industries is a company limited by guarantee, registered in England (No. 01254410). It is the leading trade association representing over 900 landscape professionals – from design, build and maintenance through to supply, training and education.

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The Landscape Institute is a professional membership organisation and an educational charity, registered in England and Wales (1073396), and Scotland (SC047057), which works to protect, conserve and enhance the natural and built environment for public benefit. It represents the interests of just under 6,000 individual members and over 450 registered practices.

www.landscapeinstitute.org

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FOREWORD

On behalf of the Landscape Institute (the LI) and the British Association of Landscape Industries (BALI), welcome to this report on carbon reduction in the UK landscape sector.

What started as an urgent need to respond to calls from government and industry to take action on the climate emergency soon gave rise to our shared ambition for our two organisations to collaborate and work together on this important issue.

We celebrate the fact that the professionalism and expertise of those working in the landscape sector touches people's lives across the country. Their collective skill and knowledge play an important part in maintaining health, wellbeing and quality of life, through activities such as designing and caring for open spaces or creating new habitats.

The sector is an increasingly significant contributor to life-sustaining services such as flood water management, and protection from the harmful effects of climate change. However, when it comes to the amount of carbon generated by landscape projects, schemes and works, we must do better.

We need to put carbon considerations at the heart of our designs and specifications, at the earliest possible stage. We can also make changes to the projects we manage on site and the way we plan and deliver subsequent maintenance.

Using our deep understanding and far-reaching expertise as landscape professionals, we can also help other industries to deal with, capture and store carbon.

We appreciate carbon is a new and additional area of work for some practitioners and businesses and may incur additional time, cost and resource. For these colleagues, we look to provide guidance and information to reduce the need for such extra requirements.

Some businesses have already made a start and the good news is that with challenges, come opportunities. United action on carbon has the potential to improve the way we work, raise the profile of our sector, expand opportunities for landscape businesses and encourage market growth.

We hope this report will inspire and engage the diverse talents and energies of those considering future careers and training opportunities at this exciting but nonetheless challenging time for landscapes and the environment.

We thank the members of the Landscape Institute's Embodied Carbon Advisory Group for their hard work in developing this report. Working across the landscape sector we intend to collaborate with colleagues in other organisations and create a unified response.

We'd like to take this opportunity to encourage members of BALI and the LI to consider the recommendations listed in the Executive Summary and section 7 of this report and to get involved in their delivery.

We also want to secure the active involvement of the widest possible range of experience and expertise from across the landscape sector. This means looking beyond our respective membership bases. With this support, we can set up the working groups required, engage with colleagues across the industry, and identify and embed the changes we need to make.

Our message to the sector is simple: Join the conversation, contribute your ideas and experience, and make a difference. Thank you for your support.

Wayne Grills
Chief Executive,
British Association of
Landscape Industries

Robert Hughes
CEO, The Landscape Institute

When we refer to 'we' and 'our' in the text we refer to the British Association of Landscape Industries and the Landscape Institute, working together as one on this key issue for the sector.

Visitors engaging with flower field (Tower of London)
© Alister Thorpe

Superbloom, by Grant Associates
© Alister Thorpe

EXECUTIVE SUMMARY

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1.1

This is the LI and BALI's report on carbon reduction in the UK landscape sector. It is one of only a handful of publications addressing the subject of carbon in landscape from the perspective of landscape professionals and businesses.

Dense planting only requires weeding for an hour, every two months © Elaine Cresswell

The Challenge

1.2

The landscape sector contributes £24.6bn to the UK economy in Gross Value Added (GVA), employs 333,900 people[1] but presently does not have an estimate as to the amount of carbon it emits. Carbon assessment is a new area of working for the profession and is likely to be of increasing importance to those procuring, commissioning and designing landscape projects and works.

1.3

At present, the landscape sector lacks basic carbon tools, knowledge and methodologies. There is a shortage of skills and lack of clarity as to what to do. Accurate data on the impact of carbon in designed landscapes is not readily available. There is willingness and capacity to take action on these matters. This includes the ambition to have a consistent process in place to quantify and act on carbon in landscape. This report explains the background together with recommendations for future action.

The Solution

The UK landscape sector makes a vital contribution to the health, wellbeing and quality of life for citizens and communities across the country. Landscape professionals work to protect, conserve and enhance the natural and built environments.

Combining this breadth of expertise with understanding of carbon in landscape, the sector can begin to make informed choices.

This BALI and LI report calls for united action on carbon across the landscape sector. It provides eight key recommendations. In summary these are:

Get involved

To indicate your interest in getting involved, please visit **landscapeinstitute.org/policy/landscape-and-carbon**, or get in touch at **policy@landscapeinstitute.org**.

1

Agree a carbon assessment process

Agree a carbon assessment and management process for the UK landscape sector, and refine the process as new techniques develop.

2

Use standard data and tools

Agree a standard for the collection and assessment of data to enable the creation of a set of tools to calculate carbon outcomes.

3

Work with suppliers

Call on manufacturers, suppliers and assessors to provide Environmental Product Declarations (EPDs) for all landscape products with fully specified data.

4

Support landscape practitioners

Consider the needs of BALI and LI members, and all landscape practitioners, particularly SMEs, and support their work to deliver net zero projects.

5

Build understanding

Work closely with other UK built environment professionals and ensure that the role and importance of the landscape sector in carbon reduction is recognised.

6

Improve education and training

Work with HR, training and development professionals to identify all necessary educational materials and build carbon into wider CPD programmes.

7

Promote landscape solutions

Promote the carbon storage potential of landscapes to policy makers and the wider public, and highlight the contribution which landscapes play in addressing the climate emergency.

8

Create a cross-sector action plan

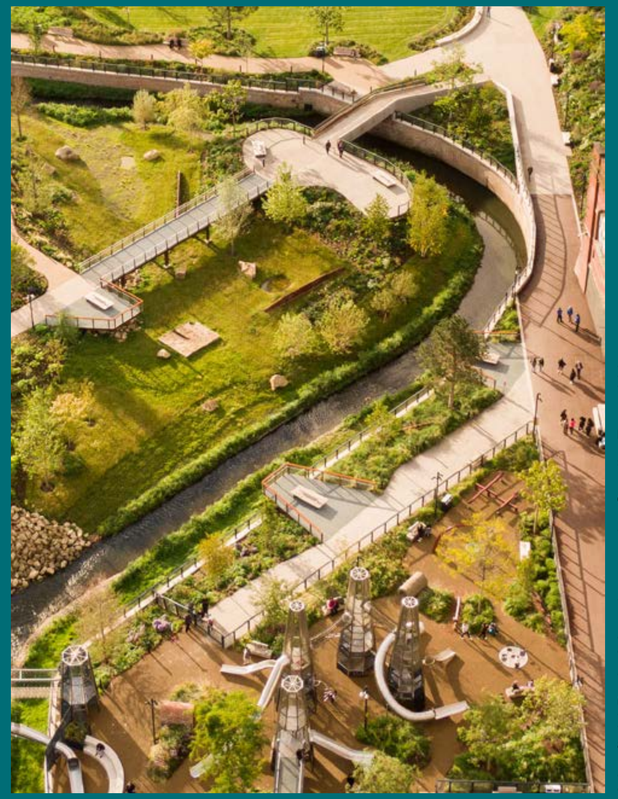
Create a cross-sector action plan to achieve net zero projects, with timescales for delivery. Assign tasks to organisations.

Father explaining plant to daughter while walking in a forest together © iStock

“The UK landscape sector makes a vital contribution to the health, wellbeing and quality of life for citizens and communities across the country.”

2 INTRODUCTION

Catching Bubbles © Leo Rivas



Mayfield Park, Manchester, by Studio Egret West
© Jarrell Goh

Union Terrace Gardens, by LDA Design
© Christopher Swan

2.1

Industries around the world are taking steps to reduce the adverse impacts of their operations on people and planet, and so must we. The global climate emergency requires urgent and comprehensive action to reduce greenhouse gas emissions across the UK landscape sector.

Collaboration is vital if we are to improve the decisions we take when designing, specifying and delivering our work. This means embracing and embedding a new approach to landscape and carbon.

2.2
This report is for members of BALI and the LI. It has relevance for the landscape profession, beyond our respective memberships and across the whole sector.

In addition to members, this report has been written with clients, contractors, practitioners, suppliers and policymakers in mind. We hope it will also be of interest to colleagues working in horticulture, in manufacturing and in areas such as ecology, materials science and soils.

2.3
This report is written at a level which does not require any prior experience of working with carbon. Basic definitions and links to further sources of expert information can be found in section 8 of this report.

This report sets out the opportunities, drivers and barriers to change, and identifies the challenges facing the landscape profession in addressing its responsibilities. It also brings together basic concepts around the climate emergency and some initial information on available tools which measure carbon.

2.4
The report is not intended to be a technical document. It does not deal with the measurement or methodology associated with reducing the individual carbon footprint of a landscape business, concentrating instead on carbon action associated with landscape schemes and works. A series of more technical briefings, focusing on each of the recommendations, is planned.

2.5
We encourage all sections of the UK landscape profession to get involved. Please share your expertise and show your support by helping us to create a comprehensive plan and process for the sector. We hope this process will contribute to the inspiration, urgency and momentum which is now required across the landscape profession. With your help and expertise, we can deliver a plan that works for everyone.

Retained existing soil. Densely planted. Maintained by community groups. Increased footfall. Urban GreenUP, Park Lane Pollinators, Liverpool © Elaine Cresswell

Get involved

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"We encourage all sections of the UK landscape profession to get involved. Please share your expertise and show your support by helping us to create a comprehensive plan and process for the sector."

Union Terrace Gardens, LDA Design © Christopher Swan

3 THE CLIMATE EMERGENCY

Stormy seas near Portcawl lighthouse © iStock

Cooling Towers © Markus Distelrath

3.1

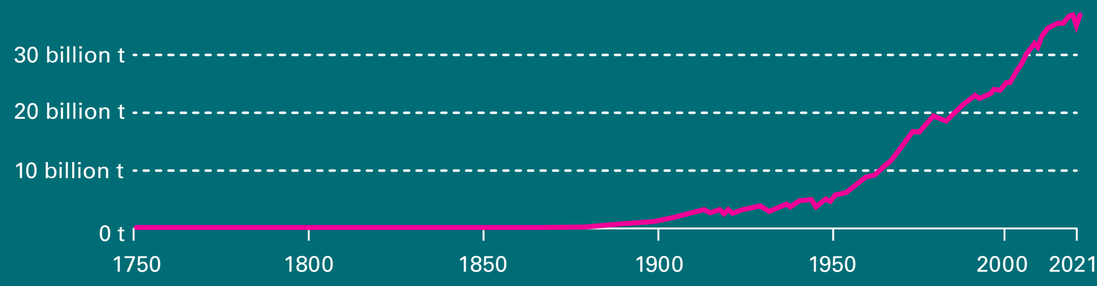
Burning fossil fuels such as coal, oil and gas has been inextricably linked to economic growth since the Industrial Revolution of the 1800s. Yet mankind has only recently, within the last 50 years or so, realised the full unintended consequences for people and planet.

Rising greenhouse gas emissions such as carbon dioxide, methane and nitrous oxide mean that unless we bring our dependency on fossil fuels to an end, there is every likelihood that we will jeopardise the safety and security of people and planet. Failure to take urgent action is likely to result in an increased incidence of severe climatic changes, rising temperatures and extreme weather conditions.
Many governments and businesses around the world have declared climate emergencies, stressing the need for concerted, urgent action to mitigate this crisis.[2]

Annual CO_2 emissions

Carbon dioxide (CO_2) emissions from fossil fuels and industry.
Land use change is not included.

Data source: Global Carbon Budget (2022)



3.2

“There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all (very high confidence). Rapid and far-reaching transitions across all sectors and systems are necessary. The choices and actions implemented in this decade will have impacts now and for thousands of years (high confidence).”

This stark warning, contained within the International Panel on Climate Change’s (IPCC) Sixth Assessment Report (March 2023)[3] was the verdict of world-leading climate scientists on their assessment of the climate emergency and ways of dealing with it. Whilst solutions to mitigate its impacts do exist, the time in which to implement them is rapidly running out.

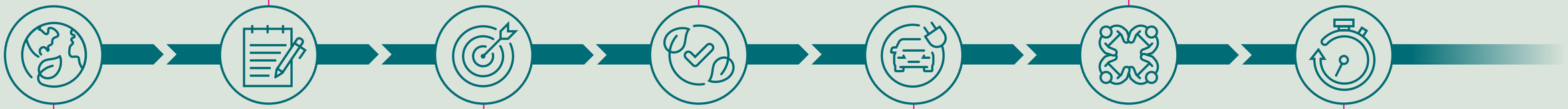
3.3

The UK built environment sector is directly responsible for 25% of greenhouse gas emissions[4]. Presently, there is no equivalent figure or data available for the landscape sector.

There is an immediate need to understand the carbon impact of our decisions. We need more data to enable this to happen. The landscape sector has the potential to positively address the climate emergency by helping to facilitate the storage and sequestration of carbon by trees, plants and vegetation. This is not widely understood. Accurate data on carbon storage and emissions would allow us to assess and reduce the carbon within the schemes and works we deliver. Presently, we do not have the data we need to effect this change.

As a sector, we can also align with wider built environment standards, where appropriate. These opportunities are best identified and pursued as part of the work which follows the publication of this report.

Carbon-related Milestones



2008

- The independent UK Committee on Climate Change is established to monitor progress, set five-yearly targets (called ‘carbon budgets’) and hold UK Government to account.

2015

- The UK signs the legally binding Paris Agreement alongside 196 countries at UN Climate Change Conference of the Parties (COP21).

2019

- The UK commits to net zero greenhouse gas levels by 2050.
- The Landscape Institute declares a climate and biodiversity emergency and sets 2029 as its corporate net zero target date.

2020

- The LI signs up to the Construction Industry Council’s ‘Carbon Zero: the professional institutions’ climate action plan.’

2021

- The UK hosts the COP26 UN Climate Change Conference of the Parties (COP26) in Glasgow.
- BALI’s company vehicles fleet goes all-electric.

2022

- The LI’s Policy and Comms Committee convenes an Embodied Carbon Advisory Group with representation from BALI to address UK landscape and carbon challenges.

2023

- BALI develops carbon mitigation toolkit for members to reduce carbon footprints.
- The Climate Change Committee’s progress report to UK Parliament says lack of progress jeopardises its own climate goals.

4 OPPORTUNITIES, DRIVERS AND BARRIERS TO CHANGE

Celtic rainforests store substantial levels of carbon.
Elan Valley, Rhyader, 2021 © Claire Thirlwall

Beech Grove Greenway, Bradford,
by LI Presidents Award winners,
Bradford Metropolitan District Council
© Paul Thompson / Better Start Bradford

The Otterspool Promenade: Grinding granite setts to make the promenade more inclusive and accessible without the need to replace existing paving. Liverpool 2022 © Elaine Cresswell

For definitions and meanings of some of the 'carbon' terms used in this report, please visit the gloassary in section 8.

4.1 The increasing importance of the landscape sector

According to a review of the UK landscape workforce[5], the sector annually contributes £24.6bn to the UK economy in Gross Value Added (GVA). It employs 333,900 people, 1.1% of the total UK workforce.

Meanwhile, the total GDP footprint of the wider ornamental horticulture and landscaping sector is estimated to grow to circa £42bn by 2030 (from £28.8bn in 2019) with an associated boost in jobs to 763,000 by that time (from 674,000 in 2019)[6]

There is general agreement that this is a moment of opportunity for our sector. These opportunities include:

- **A verified process for carbon measurement:**
  This is a new area of working for the landscape profession. Assessment methods have, to date, focussed on buildings and structures, with limited consideration of the landscape elements of a project. In the same way that PAS 2080:2023[7], as produced by the British Standards Institution (BSI), has become a leading standard for carbon management solutions in buildings and infrastructure development, an equivalent standard for landscapes is urgently needed.

- **Making informed choices:**
  We need to have the knowledge and confidence to educate and lead clients and contractors towards low carbon schemes. This can, in part, be achieved by having a range of low carbon options for consideration for the design, material selection and methodologies for project schemes.

- **Taking a circular approach:**
  At site level, we need new approaches to procurement and quantifying materials, with a focus on refurbishing, reuse and reclaiming existing site features. The embodied carbon saved by using existing materials can be enormous, yet there is rarely the skill or inclination to consider reuse – for example, reusing existing paving is perceived to be expensive and time-consuming but is likely to have a significantly lower carbon impact than disposal and new paving.

4.2 Drivers: What's behind the need to act on carbon?

- **Demand:**
  Beyond personal beliefs and ethics, many businesses now include environmental targets and policies within their governance. This can take the form of an Environmental, Social and Governance (ESG) policy using a recognised standard such as ISO 14001/14067 or Certified B Corporation.[8] Since April 2019, large businesses have been required to disclose their UK annual energy use and greenhouse gas emissions under the Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018.[9]

- **Cost saving and efficiency:**
  Many clients now require an assessment of carbon scores as a procurement condition for construction projects, particularly those funded with public money. This trend is reflected in the most recent version of 'The London Plan' (March 2021)[10] which requires carbon calculations for some larger developments.

  The government's Construction Playbook 2022[11] now advises contracting authorities to adopt the use of whole life carbon assessments. The direction of travel seems to indicate that a more stringent approach across the built environment is likely in the future.

- **Regulation and policy:**
  The built environment sector has several existing and emerging standards which inform action on carbon. Most are behind a paywall and their relevance to landscape is limited. These standards include BS EN 15978[12], BS EN 17472:2022[13] and 'CEN TC/350 Sustainability of construction works'[14]. 'PAS 2080 2023 Carbon management in buildings and infrastructure'[15], which is free to download, has most relevance to our sector. With developers increasingly expected to justify their carbon and environmental credentials, there is a need for a standard which can be applied to landscape projects.

- **Reputational benefit:**
  In an article[16] covering public concerns regarding the environmental impacts, around three in four UK adults (74%) reported feeling (very or somewhat) worried about climate change, with rising UK temperatures being the biggest impact that adults expected to experience by 2030 (75%). Public opinion can be a powerful agent for change. Additionally, taking firm action on carbon, and openly promoting the fact, keeps both the public and policymakers informed about the progress being made, with the potential to raise the profile and positive reputation of the landscape sector.

4.3 Barriers: What holds the landscape sector back?

- **Lack of technical knowledge:**
  When the authors of this report undertook some preliminary fact-finding on landscape and carbon, it quickly became apparent the pool of knowledge, expertise and research was limited. There was evidence of some exemplary activity taking place. However, beyond this, effort was scattered far and wide with no overall communication or coordination taking place. Recognising that there are still gaps in our knowledge and guidance was an important realisation.

- **Lack of an overall plan or strategy:**
  We find ourselves following in the footsteps of others, notably the built environment sector. We are a smaller sector, with fewer resources. Nevertheless, we need to develop and implement a dedicated sector-wide strategy for landscape and carbon with clear targets and a plan which includes processes to assess, reduce and store carbon.

- **Lack of data, multiple tools:**
  We currently lack the data, access to data and data formats that we need to measure, benchmark and develop targets, e.g. comprehensive product and plant data and labelling to assess the carbon embodied in the materials we specify. There is no single, comprehensive source or methodology when it comes to the data needed.

  Additionally, there is not yet a consensus over tools. There are multiple desktop software applications and web-based tools available, each with their own particular method of calculating and presenting carbon data. However, these are presently not easy to compare. A dialogue involving those landscape professionals who have been among the 'early adopters' trialling the various tools is needed. Once again, this is an activity which can follow the publication of this report.

- **Skill shortages, limited resources:**
  Embracing digital ways of working ranked as joint highest business challenge, alongside procurement hurdles, in the 'Skills for Greener Places' survey[17]. The same survey identified that 94% of landscape businesses employ less than 10 people. Practical guidance and support, which our sector needs to create, will be required to support SMEs across the sector.

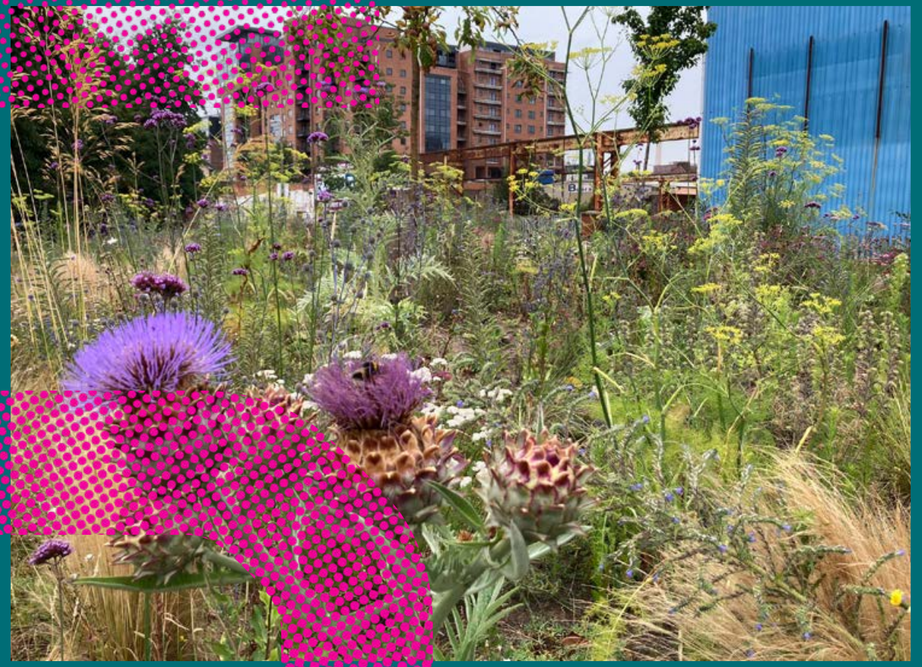
People, place, nature: restoring habitats

Aberfeldy Estate, Tower Hamlets.
Landscape Institute award-winner, 2018.

"With developers increasingly expected to justify their carbon and environmental credentials, there is a need for a standard which can be applied to landscape projects."

Play time at Cator Park, Kidbrooke Village © HTA Design

THE ROLE OF THE LANDSCAPE SECTOR

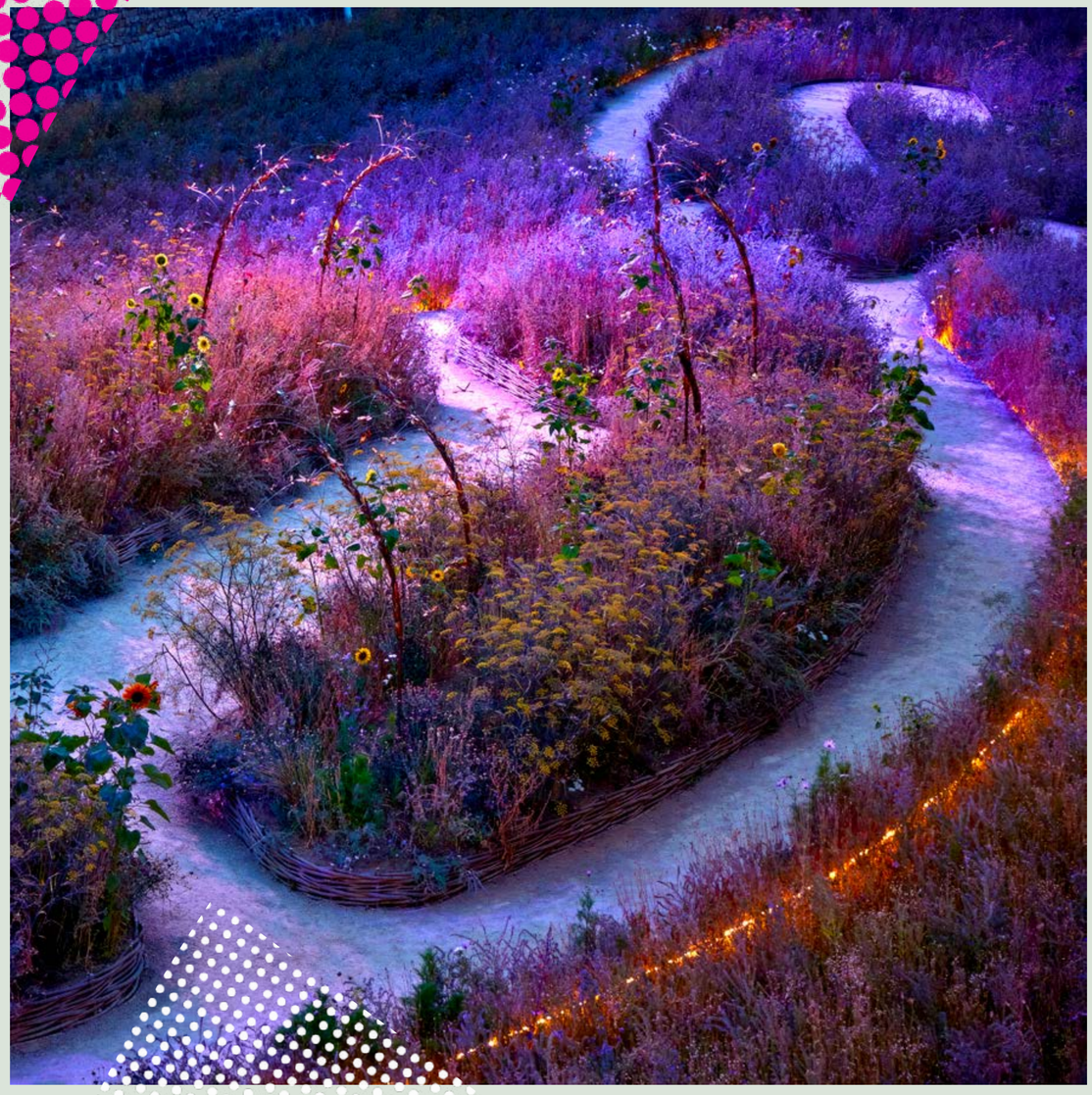


Self-seeding species specified to fill planting gaps, enabling year-round biodiversity, Urban GreenUP, Wapping Pollinators © Nick Harrison

Nature based solutions help reduce the impact of climate change - newly created leaky dam in Grasmoor Country Park, Chesterfield, 2022 © Claire Thirlwall

5.1 Benefits of a holistic approach

One of the most important strengths we have as a sector is our ability to take an integrated, holistic approach to the schemes we design and build. Such an approach comes with an understanding of the many complex interactions between natural processes and human life – between natural, economic, and social capital. The landscape profession is in a position to tackle specific climate challenges head on and, through design, realise multiple secondary benefits at the same time.



Superbloom, by Grant Associates © Alister Thorpe

In order to ensure the best carbon outcomes, carbon data for materials needs to be considered at the earliest point within the design phase of a scheme or project, alongside cost, appearance and performance details. The project team will also want to demonstrate that all materials have been responsibly sourced and procured. Early dialogue with suppliers and contractors will make this process easier.

Embedding carbon data and choices from the outset of a project, at the design stage, will be transformational. This fundamental change in the way we work creates a timely opportunity for our sector to work together to do what is right. Openness and transparency can be the hallmarks of our collective response to this challenge.

5.2 Designing out carbon

Many of the design elements that landscape projects use rely on fossil fuels for their content and production. We will need to decarbonise many of the man-made, manufactured products we currently use, if we are to achieve net zero carbon emissions by 2050.

Advances in material science and innovation will take time to create viable alternatives. In the meantime, a greater dependency on natural materials can offer significant opportunities.

Measuring the carbon content of natural materials comes with some challenges. For example, a tree might not grow at the predicted rate, due to outside influences such as drought, poor soils or competition from surrounding vegetation. This will change its carbon impact on a project.

As landscape professionals, we have a responsibility to understand and communicate how natural landscapes and material choices can deliver climate resilience and biodiversity.

Aerial image of quarry © Tracielouise

Close up of person handling well-rotted compost © iStock

Site clearance, disposal and preparation © iStock

5.3 Soil and carbon

Soil is the largest store of carbon on land, storing nearly twice as much carbon as all plants and the atmosphere combined. In the UK, soils represent the largest terrestrial carbon stock, holding approximately 95%.[18]

It is a non-renewable resource and takes tens of thousands of years to form. Yet 30 million tonnes of soil from UK construction sites alone gets sent to landfill every year. When soil is disturbed or transported, carbon is emitted into the atmosphere as CO_2. Destruction or degradation of landscape precipitates loss of carbon stored. As landscape professionals, we are used to managing and protecting soil. Carbon storage provides an additional reason to protect and conserve soil health.

The amount of carbon which can be disturbed on a site when construction works take place can be substantial and is not always considered or correctly factored into carbon calculations. Increasingly, the re-use of the existing materials found on site is a lower carbon option than the purchase and delivery of replacement materials and the carbon cost of transporting those materials from further afield.

Insight:
Queen Elizabeth Olympic Park

One of the most significant and successful landscape schemes of the last 25 years has been the delivery of London's Queen Elizabeth Olympic Park. The park we enjoy today would not have been possible had it not been for a sizeable and systematic investment in soil washing, decontamination and production on what was, previously, a polluted industrial site. The soil strategy supported landscape design, the creation of ecological habitats, environmental interaction and water attenuation and filtration. A total of nine soil types were eventually identified, each with its own specific composition to meet the needs of the plants and functions of the landscape. Working with the existing onsite materials reduced the amount of additional soil to some 50,000m^3 of topsoil and 36,000m^3 of subsoil, most of which was transported by rail.[19]

The alternative - removing all onsite materials as waste and replacing these with fresh soils – was not an option given the Olympic Development Authority (ODA)'s commitment to make London 2012 the 'greenest games' on record and would have added, together with the associated transport, unacceptable levels of carbon.

For a review of the soil health of the Olympic Park ten years on, see Landscape, the Journal of the Landscape Institute, water edition, p62 (Jan 2024)

Peatlands store high levels of carbon and can continue to sequester carbon over millennia[20]. Whilst few projects will include peatlands, all areas of topsoil can be managed to achieve the minimum carbon loss and maximum carbon storage. Both processes can occur on a site, a phenomenon known as carbon flux, with carbon stored and emitted at different times due to site conditions.

The 2022 report "Building on Soil Sustainability – principles for soils in planning and construction", produced by the Soils in Planning and Construction Task Force[21] explains the role of soil in carbon storage and how disturbing soil releases carbon into the atmosphere. It includes useful techniques for assessing, retaining and storing carbon.

View of the Olympic Park site in May 2022 © JasonHawkes.com

5.4 Data and tools

Data

More carbon data is needed for more products and plants. What information exists can be inconsistent and difficult to interpret. The provision of Environmental Product Declarations (EPDs) by manufacturers and suppliers is not mandatory. EPDs for all products including fully specified carbon data is needed. Accurate, consistent and trusted product data is absolutely essential to enable comparisons to be made and enable lower carbon options to be considered and specified.

In the UK, the launch of the Built Environment Carbon Database (BECD)[22] in October 2023 is a welcome step. Free-to-access, and backed by leading organisations in the built environment sector, the database is envisioned to become the main source of carbon estimating and benchmarking for the UK construction sector. Presently it contains limited landscape-related data.

A number of UK universities have collected landscape-related carbon data, but more data from verified sources is needed. Some data is available for semi-natural habitats[23], forestry[24] and for agricultural land use[25].

Tools

When it comes to calculating the carbon scores of individual products and plants or entire landscape schemes there are several desktop or web-based tools available. However, most of these applications are intended for buildings rather than landscapes and provide similar functions, such as taking basic measurements, calculating carbon scores and or suggesting a range of alternative interventions.

There have been various reviews of the available tools and their performance in practice. Research by Dr Anastasia Nikologianni AMLI and Dr Alex Albans[26] identifies three tools with what is described as 'significant' focus on landscape:

- Pathfinder[27] (also referred to as the Carbon Positive Design tool)
- Landscape Carbon Calculator[28]
- Carbon Conscience App[29]

Other tools include:

- i-Tree[30]
- Precinct Carbon Assessment (PCA)[31]
- Embodied Carbon in Construction Calculator (EC3)[32] and
- One Click LCA[33]

The Nikologianni and Albans research concludes that "tools to measure carbon must be combined with professional knowledge and expertise, social engagement, and impact indicators such as the 'Principles for Harnessing the Landscape' adopted by the United Nations Habitat Roadmap for Recovery (2022)[34]". This includes a commitment to establish an International Landscape Convention (ILC) as championed by the UN Habitat Professionals Forum (HPF) and 24 major associations and federations including the International Federation of Landscape Architects (IFLA).

Several UK landscape practices have shared their experiences with the LI after trying these carbon calculation tools, notably the Pathfinder tool.

Colleagues at reShaped trialled the Pathfinder tool on their award-winning Urban GreenUP project. Their experiences underlined the pressing need for Pathfinder to provide and make use of UK data.

Colleagues at LDA Design reviewed a selection of their assignments completed over a two-year period, re-running the primary data through Pathfinder. This exercise revealed the number of years it would take for the scheme in question to achieve a net zero score, providing an important first step in understanding the carbon impact of projects. This has inspired the practice's ambition to contribute to creating an industry-wide standard process.

Endorsement disclaimer: Mention of specific tools or brands within this report is solely for educational purposes and does not imply endorsement by the BALI or LI nor discrimination against similar products not mentioned.

Tools	Landscape focus	Use/applied to	Calculates
Pathfinder	Very significant	Landscapes / Green spaces	Carbon emissions and project sequestration
Landscape Carbon Calculator	Very significant	Landscapes	Carbon emissions and sequestration
Carbon Conscience App	Very significant	Early stage of planning and design	Embodied, sequestered and stored carbon
i-Tree	Significant	Green infrastructure (trees)	Impact of trees
PCA	Less significant	Buildings	Environmental elements of buildings
EC3	Less significant	Planning / buildings	Carbon related to materials and constructions

Mayfield Park, Manchester

View over Mayfield Park © Martin Malies

Writing in the LI Journal, Martin Lee of Studio Egret West, landscape designers of Manchester's Mayfield Park, talks about the tool's usefulness and nature-based carbon sequestration as a metric for sustainable design.

"The next step is to encourage clients, developers, local authorities and other designers to be more transparent about the carbon impact of development and how to address it properly," says Martin. "We should feel inspired in having nature-based skills and tools to create better environments for people and nature, while also addressing emissions on-site."

Read the full article in the Further Reading section.

Dense seasonal planting © Nick Harrison

5.6 Climate positive design

It's important to add to UK understanding and knowledge with that from landscape trade bodies and professional membership organisations operating elsewhere. The Australian Institute of Landscape Architects (AILA) champions climate positive design as one of its three core values, alongside connection to country and gender equity.

For a scheme to be described as 'climate positive' means that the delivered scheme would store more carbon than it emits. Responding to Australia's Climate Council aim to secure a 100% reduction in embodied and operational emissions without offsets by 2040, AILA is pursuing these ambitious targets.

To support its members, AILA has published three reports: a climate positive design action plan, an organisational guide (to reducing corporate footprints) and a roadmap for the AILA Executive and State groups (reducing AILA's carbon footprint). These can be found on the AILA website together with a series of carbon-specific 'short explainer' videos.

In the United States, the American Society of Landscape Architects (ASLA) has set equally ambitious targets. These support the vision set out by the International Federation of Landscape Architect's (IFLA) for all landscape architecture projects to simultaneously achieve zero embodied and operational emissions by 2040 and increase sequestration, provide significant economic benefits, address climate injustices, and restore ecosystems.

Go to 'Further Reading' (section 10) for more information.

6 CONCLUSIONS

Artist impression of multipurpose path ©WWT

6.1

It is time for our sector to act. We must work together to develop a consistent approach, one which will allow us to measure and reduce the carbon impact of the schemes we deliver. This begins with the designs we create, the choices of materials we use onsite and the methodologies we deploy.

Landscape professionals have an important role to play as ambassadors for the environment. We need to encourage our clients, challenge commissioning agents and all those procuring projects to consider the carbon impacts of a project at the earliest possible stage. In this way, we can champion the benefits for people, place and nature which will flow from low carbon, sustainable design.

We can influence governments and policymakers to set high standards, encouraging whole-life design and construction choices over the cheapest, short-term options.

The cumulative impact of taking action across all aspects of landscape will change the way we work. The eight recommendations that follow address the barriers to change and support the sector in responding to some of the challenges and opportunities presented by the climate emergency.

In order to deliver these recommendations, we will:

- Invite stakeholders from across the landscape sector, and wider industry, to actively participate and engage.
- Create a Steering Committee to receive feedback and agree an action plan.
- Convene a series of ‘Task & Finish’ (T&F) groups to develop specific recommendations.

7 RECOMMENDATIONS

Queen Elizabeth Olympic Park © LLDC

Hanham Hall by HTA Design and Barratt © Nick Harrison

Get involved

To indicate your interest in getting involved, please visit landscapeinstitute.org/policy/landscape-and-carbon, or get in touch at policy@landscapeinstitute.org.

Queen Elizabeth Olympic Park was made possible by extensive soil remediation work © Claire Thirlwall

1 Agree a carbon assessment process

Agree a carbon assessment and management process for the UK landscape sector, and refine the process as new techniques develop.

With no agreed standard for assessing carbon emissions and storage within projects, landscape professionals are unable to demonstrate the climate value of their work. A standard process will validate our expertise and enhance our role and contribution on projects delivered.

Any standard must be on a par with other construction sector standards, such as a PAS (Publicly Available Standard) and be free to access at source. The results of the assessment must be easy to compare, for example as a carbon score per m^2, to allow comparison between project options.

2 Use standard data and tools

Agree a standard for the collection and assessment of data to enable a set of tools to calculate carbon outcomes.

Although there are product category rules for several types of materials used in landscapes, there is no specific standard for recording and comparing carbon data in the landscape sector. Guidance is needed to make sure the data collected is comparable with other data sets and work is needed to test available tools, including software.

3 Work with suppliers

Call on manufacturers, suppliers and assessors to provide Environmental Product Declarations (EPDs) for all landscape products with fully specified data.

Product data including carbon values is available but this mainly covers proprietary products, such as paving materials and street furniture. There is limited data for generic landscape products such as soils, mulches, timber products and plant stock. The data produced can be difficult to interpret, which in turn makes it difficult to compare products.

Explore opportunities for commercialisation, market innovation and new business models with suppliers, to offset their costs and help drive mass adoption.

4 Support landscape practitioners

Consider the needs of BALI and LI members, and all landscape practitioners, particularly SMEs, and support their work to deliver net zero projects.

One of the four priorities in the LI Climate and Biodiversity Action Plan is "equipping the profession to provide solutions to the climate and biodiversity emergency." In respect of landscape and carbon this is essentially about how the landscape sector can best support small-to-medium-sized businesses (SMEs), sharing good practice and championing innovation. Careful consideration will be given to identify, anticipate and seek solutions to meet their needs. Larger businesses and practices have also indicated their willingness to support their SME colleagues.

5 Build understanding

Work closely with other UK built environment professionals and ensure that the role and effectiveness of the landscape sector in carbon reduction is recognised.

Many of the considerations facing the landscape sector are common to the wider built environment sector. As we work through the process for assessing and managing landscape and carbon, we will share our knowledge and experience. This can be achieved through a combination of formats including a cross-sector working group and collaboration online.

6 Improve education and training

Identify all necessary educational materials and build carbon into wider CPD programmes and work with HR, training and development professionals.

As a sector, we need to improve carbon education and training for all career stages including support for those coming into the landscape profession from other sectors. For those starting their career now, the issue of carbon measurement and storage will be something they will spend much of their working life on.

It is vital that we clearly set out the green jobs available now and into the future across the sector, and promote these opportunities to the next generation of landscape professionals..

7 Promote landscape solutions

Promote the carbon storage potential of landscapes to policy makers and the wider public, and highlight the contribution which landscapes play in addressing the climate emergency.

Landscape professionals deliver amenities and functionality through landscapes for the benefit of society. These include but are not restricted to: maintaining health and wellbeing, improving air quality, urban cooling, contributing to food production and security, increasing biodiversity and restoring nature, reducing greenhouse gas emissions, and reducing and storing carbon. We need to articulate and evidence these outcomes and ensure that the value of our work is understood by clients, policymakers and the public. This will require careful stewardship and strong promotion.

8 Create a cross-sector action plan

Create an action plan to achieve net zero projects, with timescales for delivery and assign tasks to organisations.

The lack of an overall plan or strategy has already been identified as a barrier to change. Bringing forward an action plan informed by a range of stakeholders from across the landscape sector is paramount.

Join the conversation, contribute your ideas and experiences, and make a difference. To get involved please visit landscapeinstitute.org/policy/landscape-and-carbon or email policy@landscapeinstitute.org

New Islington Cotton Fields © Urban Splash

GLOSSARY

Making Space for Nature in Cornish Towns

Mayfield Park, Manchester, by Studio Egret West
© Jarrell Goh

Aerial view of woodland canal © iStock

8.1

The definitions used in Landscape and Carbon have been sourced from the document ‘Carbon Definitions for the Built Environment, Buildings and Infrastructure’ (January 2023), except where indicated, and appear here with the kind permission of the Low Energy Transformation Initiative (LETI). The LETI report provides more definitions and explanatory diagrams. leti.uk/carbondefinitions.[35]

8.2

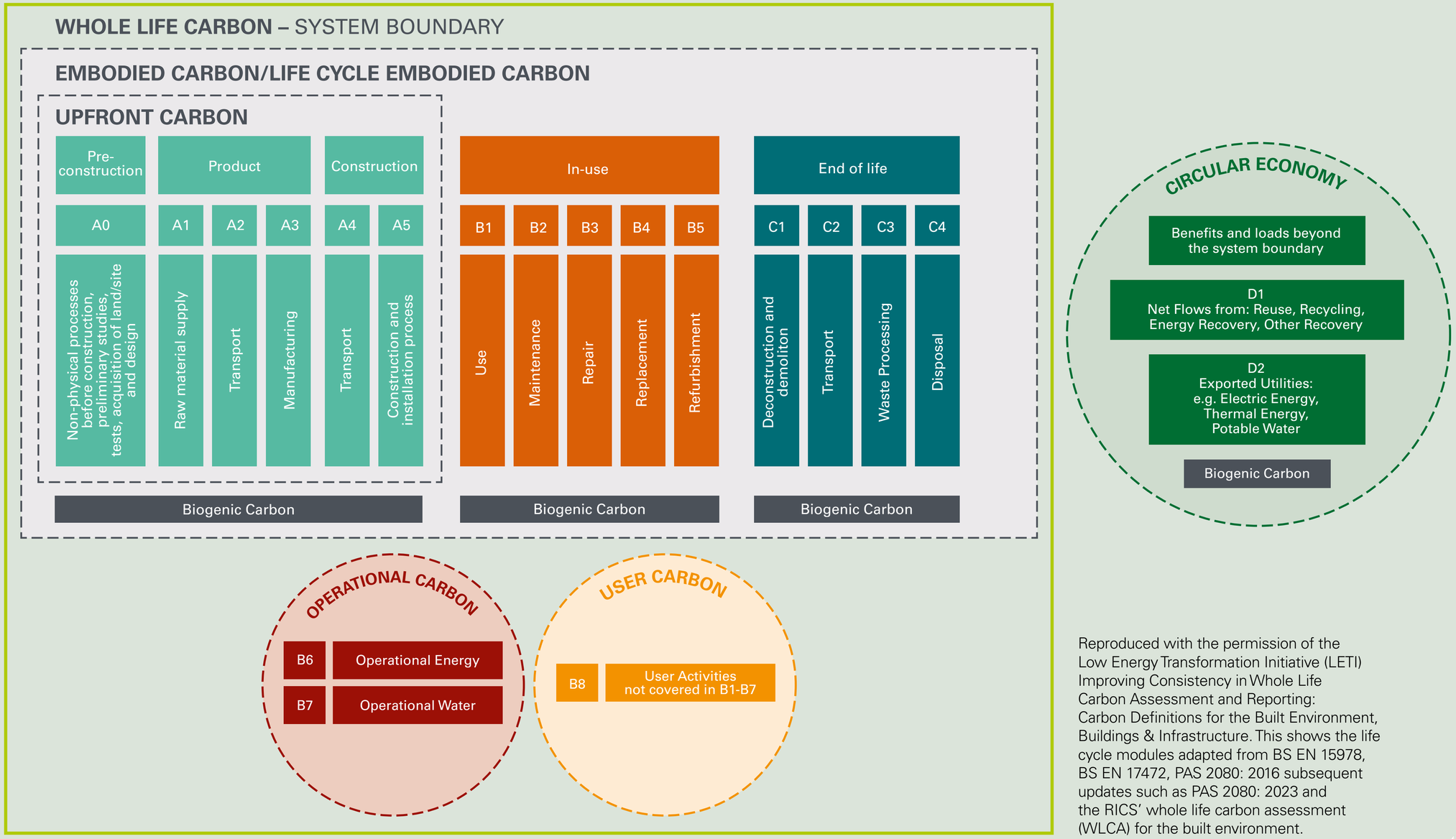
Please note that the definitions created by LETI were subsequently adopted by the Royal Institution of Chartered Surveyors and used to update their industry-flagship publication ‘Whole life carbon assessment (WLCA) for the built environment, 2nd edition’ in November 2023. Section 10 - Further Reading.

8.3

The diagram on the following page appears in both the LETI and RICS publications and sets out the process for the assessment of projects in the construction and built environment sector. Although unsuited to landscape, these diagrams do provide some clues and inspiration as to how a similar process might usefully be developed for landscape. For completeness, the RIBA Plan of Work is another process which landscape architects mention as a possible starting point.

8.4

Landscape arguably deserves its own process diagram. What that looks like and how such a process might work in practice can be an important task for active sector-wide discussion and collaboration once this report has been published.



Reproduced with the permission of the Low Energy Transformation Initiative (LETI) Improving Consistency in Whole Life Carbon Assessment and Reporting: Carbon Definitions for the Built Environment, Buildings & Infrastructure. This shows the life cycle modules adapted from BS EN 15978, BS EN 17472, PAS 2080: 2016 subsequent updates such as PAS 2080: 2023 and the RICS' whole life carbon assessment (WLCA) for the built environment.

Circular economy

The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources. The circular economy is based on three principles, driven by design: Eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature.

[Source: The Ellen Macarthur Foundation[36]]

Cradle-to-cradle

Cradle-to-cradle means a product is designed so that its materials and components can be repurposed- or recycled indefinitely. This makes products "circular" and reduces their environmental impacts. [Source: Ecochain[37]]

Cradle-to-gate

Cradle-to-gate is an important term in the environmental footprint method Life Cycle Assessment (LCA). It's an LCA model that assesses a product's environmental footprint from raw materials extraction until it leaves the factory-"gate". [Source: Ecochain[38]]

Cradle-to-grave

Cradle-to-grave is a model used in the scientific footprint method Life Cycle Assessments (LCA). It assesses the complete environmental footprint of products, from raw material extraction, production, and product use, until the end of its life. This is the standard in our current "linear" (as opposed to circular) economy. [Source: Ecochain[39]]

Embodied Carbon

The embodied carbon emissions of an asset are the total Greenhouse Gases (GHG) emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset (Modules A0-A5, B1-B5, C1-C4, with A0 assumed to be zero for buildings).

Environmental Product Declaration (EPD)

A document that clearly shows the environmental performance or impact of any product or material over its lifetime. Source: RICS Whole Life Carbon Assessment for the built environment. (2nd edition, September 2023).

Greenhouse Gases

Greenhouse Gases (GHGs) are constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This definition covers the GHGs with Global Warming Potential (GWP)assigned by the Intergovernmental Panel on Climate Change (IPCC), e.g. carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC's), perfluorocarbons (PFC's), and sulphur hexafluoride (SF_6).

Life Cycle Assessment

A multi-step procedure to quantify carbon emissions (embodied and operational) and other environmental impacts (such as acidification and eutrophication) through the life stages of a building. The EN 15978 standard is typically used to define the different life cycle stages A1-3 ('Cradle to Gate'), A1-3 + A4-5 ('Cradle to Practical Completion of Works'), B1-5 ('Use'), C1-4 ('End of Life'), and D ('Supplemental'). In the case of whole life carbon, an LCA assesses GHG emissions measured in carbon dioxide equivalent to evaluate Global Warming Potential (GWP). Thus the use of predicted CO_2 data across the Life Cycle Stages relevant to the particular development allows comparisons of different options in relation to impact on whole life carbon as well as demonstrating that a certain level of carbon emission reductions have been met at design stage 1.

[Source: LETI Embodied Carbon Primer]

Operational Carbon – Infrastructure

The scope of operational carbon GHG emissions of an infrastructure asset are those that align with the scope of Operational Expenditure (or Opex) as determined by the asset owner's preference. Modules B1-B5 must each be clearly identified as capital carbon or operational carbon within the scope. Module B8 must be clearly identified as operational carbon or user carbon within the scope. Modules B6 and B7 are always operational carbon within the scope.

Upfront carbon – Buildings

Upfront carbon emissions are the GHG emissions associated with materials and construction processes up to practical completion (Modules A0-A5). Upfront carbon excludes the biogenic carbon sequestered in the installed products at practical completion.

User Carbon

User carbon (B8) are those GHG emissions associated with a user's utilisation of the buildings or infrastructure during the use stage excluding B6 and B7. These must be clearly identified as operational carbon or user carbon within the scope if addressed.

Whole Life Carbon

Whole life carbon emissions are the sum total of all asset related GHG emissions and removals, both operational and embodied over the life cycle of an asset including its disposal (Modules: A0-A5; B1-B7; B8 optional; C1-C4, all including biogenic carbon, with A0 assumed to be zero for buildings). Overall Whole Life Carbon asset performance includes separately reporting the potential benefits or loads from future energy or material recovery, reuse, and recycling and from exported utilities (Modules D1, D2).

A0 is generally assumed to be zero for buildings, however for infrastructure projects A0 can include ground investigations and activities associated with designing the asset.

Studio Courtyard, by Studio Egret West © Jarrell Goh

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Zetland Park Regeneration Project. A jetty, with interpretive handrails, extends into the pond to form a dipping board, promoting immersive outdoor learning. © LUC

We encourage all sections of the UK landscape profession to get involved. Please share your expertise and show your support by helping us to create a comprehensive plan and process for the sector. Visit landscapeinstitute.org/policy/landscape-and-carbon, or contact us at policy@landscapeinstitute.org

10

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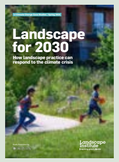

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The 'half a high street' designed by BD in collaboration with Jan Kattien Architects © Jack Hobhouse

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Screen and square looking towards Lochgilphead © ERZ

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