



Issue 113 | September 2021

inpractice

Bulletin of the Chartered Institute of Ecology and Environmental Management

The Next 30 Years: Views from
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**30th Anniversary Edition:
The Next 30 Years**

Carbon Offsetting to Achieve Net Zero by 2030

Figure 1. Hummocks of *Sphagnum* moss amidst characteristic bog plants at Fenn's, Whixall and Bettisfield Mosses National Nature Reserve. Photo: Stephen Barlow.



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Keywords: carbon offsetting, climate emergency, CO₂ emissions, nature-based solutions, net zero, offsetting principles

Atmospheric concentrations of CO₂ have reached levels that are disruptive and damaging to life on Earth. Emissions of greenhouse gases must be swiftly and substantially reduced. Fossil fuels should be avoided. Unavoidable emissions require the rapid removal of equivalent amounts of CO₂ from the atmosphere.

Carbon offsetting schemes involving nature-based solutions can be used to compensate for unavoidable emissions. This article sets out principles for individual and corporate offsetting schemes. Future action is not an option: real-time offsetting is needed now. The best action is to stop emitting greenhouse gases.

Offsetting for CO₂ emissions

Targets to achieve net zero emissions of CO₂ by 2030 (Box 1) mean that adding CO₂ (or another greenhouse gas such as methane) to the atmosphere requires an equivalent amount of CO₂ to be removed from the atmosphere or prevented from entering it. Efforts must always be focused on the earlier stages of the carbon management hierarchy – that is, eliminate, reduce and substitute – rather than the final stage: compensate (IEMA 2020). Unavoidable emissions can be offset (or balanced) by carbon credits purchased from credible

schemes, ideally involving nature-based solutions. Offsetting is a way of paying for others to reduce emissions to the atmosphere, or absorb CO₂ from the atmosphere, in order to compensate for one's own emissions.

Box 1 Global heating

Average global temperatures are currently 1°C higher than in preindustrial times due to human activities. The UN Intergovernmental Panel on Climate Change special report (IPCC 2018) states that global heating could be kept to a maximum of 1.5°C by 2100 if we all act now. A further rise to 2°C by 2100 would significantly increase the risks of drought, floods and extreme heat and the resultant poverty, hunger and disease for hundreds of millions of people. Restricting global heating to 1.5°C above preindustrial levels requires halving global emissions of greenhouse gases by 2030 and ending emissions by 2050.

The urgency is clear. Only a further 420 billion tonnes of CO₂ can be released into the atmosphere globally if the average increase in global temperature is to be kept to a maximum of 1.5°C (IPCC 2018). The current global emissions of 42 billion tonnes of CO₂ every year blows this 'carbon budget' in only 10 years. We have to act now.

Carbon offsetting schemes can include carbon reduction, energy efficiency, renewable energy, and habitat creation and restoration projects. Many of the projects are in developing countries and provide additional benefits such as biodiversity, education, jobs, food security and clean drinking water, and they also promote health and well-being.

Reductions in CO₂ emissions through energy efficiency or renewable energy supplies are necessary projects, but CO₂ needs to be removed from the atmosphere now. New CO₂ emissions will increase CO₂ levels, resulting in further consequences. CO₂ can be removed from the atmosphere by creating habitats such as woodlands

or by restoration of habitats such as peatland or coastal salt marsh (Anderson and Morris 2021, Environment Agency 2021, Gregg *et al.* 2021).

Offsetting schemes have a part to play in delivering funding for these projects at the scale and speed needed to make a real difference. The costs of formal offsetting schemes vary and there are certification frameworks to ensure schemes are verifiable and registered. It is vital that offsetting schemes are viable and effective and are delivering the scale and timeframe of the CO₂ storage that is claimed.

We must be realistic. It is not possible to offset current UK emissions through better environmental management alone. Deep cuts in emissions across all sectors are required with nature-based offsetting schemes playing a crucial role in compensating for the absolutely unavoidable residual emissions.

What is CIEEM doing?

In 2019, CIEEM committed to achieving net-zero carbon emissions by 2030. Since 2016, the greenhouse gas emissions produced by Secretariat and formal committee travel, along with energy usage at the office in Winchester, have been recorded and converted into a carbon footprint using carbonfootprint.com. CIEEM has now expanded the 'scope' of the emissions being recorded to include wider services and emissions produced along the supply chain using a bespoke carbon calculator based on official conversion factors (BEIS 2020). CIEEM's carbon emissions and the steps being taken to reduce the emissions were summarised in this publication by Connett and Box (2020).

Since 2016, CIEEM has offset its unavoidable emissions every year by making a donation equivalent to the average cost of offsetting the annual carbon emissions determined by carbonfootprint.com to support environmental projects:

- Plantlife wildflower meadow habitat conservation in England (www.plantlife.org.uk/uk)
- The Native Woodland Trust planting programme in Ireland (www.nativewoodlandtrust.ie/)
- Trees for Life Caledonian Forest restoration in Scotland (<https://treesforlife.org.uk/>)

- Project Seagrass in Wales (www.projectseagrass.org/)

These projects are providing long-term carbon sequestration and significant benefits for biodiversity. From 2021, a selection of projects that meet the new CIEEM offsetting principles (further details below) will be put to a member vote to choose the project to be supported each year. This will raise awareness among CIEEM members about offsetting and how CIEEM is dealing with its unavoidable residual carbon emissions.

The CIEEM Carbon Reduction Plan (CRP) was approved by the Governing Board in June 2021 and published in July (<https://cieem.net/resource/cieem-carbon-reduction-plan/>). The CRP sets out the baseline carbon emissions, how they are recorded, the projects for reducing emissions and how unavoidable emissions will be offset. The CRP will be updated annually to recognise actions taken. The principles for carbon offsetting set out below are included in the CRP to guide future offsetting projects.

Principles for carbon offsetting

Unavoidable CO₂ emissions each and every year require high-quality offsetting schemes that follow offsetting principles for the removal of equivalent amounts of CO₂ from the atmosphere.

PAS 2060 (British Standards Institution; www.bsigroup.com/en-ID/PAS-2060/) is an internationally recognised specification for carbon neutrality that sets out requirements for quantification, reduction and offsetting of greenhouse gas emissions. The Oxford Offsetting Principles (Allen *et al.* 2020) provide a framework of general principles for credible offsetting schemes that can be linked to achieving net zero; these principles include existing best practices for offsetting schemes. The Environment Agency (2021) has reviewed approaches to offsetting using a set of eight characteristics.

The principles below take account of PAS 2060, the Oxford Offsetting Principles and the Environment Agency (2021) review.

- Additional: it is fundamental that offsetting funds do not pay for work that would have happened anyway.

- **Verifiable:** verification and certification of the CO₂ offsetting in a transparent and accountable process.
- **Remove CO₂ from the atmosphere:** nature-based solutions that create new habitats and restore existing habitats and ecosystems that will help to address the biodiversity crisis and deliver ecosystem services.
- **Permanent:** the CO₂ removed from the atmosphere should not be released in the future except through natural processes.
- **Undertaken in real time:** CO₂ emissions should be offset simultaneously with their generation or over a defined short period of time.
- **Based locally:** offsetting schemes should ideally be based in Britain or the island of Ireland.
- **Avoid negative impacts:** offsetting schemes should have a very low risk of creating unintended consequences for people or the environment.

Offsetting CO₂ emissions now and not in the future

Offsetting can appear to be an effective way of dealing with CO₂ emissions released by our activities and operations. However, many

offsetting schemes can be categorised as ‘deferred offsetting’ in that the scheme will not deliver its claimed benefits until some point in the future, for example the several decades needed for trees planted now to mature and effectively absorb CO₂. The Oxford Offsetting Principles recognise this issue of timeliness: “...any time gap between the purchase of the offset and the successful execution of the emission reducing or carbon removing activity must be minimised” (Allen *et al.* 2020, p. 5). The Environment Agency review of offsetting includes ‘speed and scale’ as one of the eight evaluation characteristics and concludes that a critical factor is how quickly the offsetting approach produces emissions reductions or CO₂ removals (Environment Agency 2021).

The real-time offsetting principle stating that unavoidable CO₂ emissions should be offset simultaneously with their generation or over a defined short time period involves complex issues. What does such a real-time offsetting scheme look like? What would this mean for our landscapes and the wider countryside and the relationship between agriculture, forestry, landscapes and amenity? Verification and certification of both the

ecological and carbon performance of such schemes must be involved. These difficult questions cannot be avoided and will focus efforts on the earlier stages of the carbon management hierarchy – eliminate, reduce and substitute – rather than the final stage of compensating through offsetting or carbon credits.

Offsetting CO₂ emissions through habitat creation and habitat restoration schemes

Soils, vegetation, freshwater and marine ecosystems are carbon sinks in complex and dynamic equilibrium with atmospheric CO₂. These carbon sinks are not necessarily full but may not be able to absorb CO₂ as fast as it is being released from the use of fossil fuels and from the destruction of habitats that already store carbon.

New CO₂ emissions will accumulate in the atmosphere and will require new habitats and newly restored habitats to become effective carbon sinks. This can be done by creating habitats, such as mixed deciduous or native pine woodlands on poor-quality agricultural land, and by restoring existing habitats, for example naturally functioning peatlands (Figures 1 and 2), salt marshes or seagrass meadows (Figure 3). The



Figure 2. An area of the National Nature Reserve being restored by bunding peat into cells with pipes installed to direct excess water into other areas. The restoration is part of a £5 million EU LIFE-funded Marches Mosses BogLIFE Project. Photo: Stephen Barlow.



Figure 3. Seagrass beds form a globally significant carbon store. Photo: Lewis Michael Jefferies/WWF-UK.

restoration of degraded peatlands will initially reduce the losses of CO₂ from the degraded peat into the atmosphere but will subsequently remove CO₂ from the atmosphere; naturally functioning peatlands provide great biodiversity gains. Coastal and marine ecosystems have an extremely valuable role to play in sequestering CO₂.

Nature-based solutions must play a key role in mitigating against and adapting to climate change and reversing ongoing declines in biodiversity in

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tandem (CIEEM 2020, Committee on Climate Change 2020, Natural Capital Committee 2020, The Wildlife Trusts 2020, Environment Agency 2021, Gregg *et al.* 2021, Stafford *et al.* 2021). Carbon reduction or offsetting schemes must utilise the full suite of high-carbon habitats available (Gregg *et al.* 2021) in areas where they are most suited to the environment and to support local biodiversity.

Resilient ecological networks are needed that join habitats with green and blue corridors, extending across landscapes to enable species to colonise new areas. The Lawton report *Making Space for Nature* (Lawton *et al.* 2010) has the mantra of “more, bigger, better, joined up”. England is the focus, but the principles apply to all contexts and geographies. Everyone needs contact with natural environments every day for physical and mental health and well-being (Lovell *et al.* 2020).

Habitat restoration and habitat creation schemes must be ambitious and large

scale to make a real impact on reducing CO₂ levels and tackling the ongoing losses of biodiversity. Nature-based solutions can deliver carbon reductions and can enhance the stocks of natural assets and the associated ecosystem services (Natural Capital Committee 2020, Gregg *et al.* 2021, Stafford *et al.* 2021). Integrated approaches are required and nature-based solutions must deliver multiple benefits. An excellent example is the review of recent ecological research by Di Sacco *et al.* (2021) who propose 10 golden rules for forest ecosystem restoration to maximise rates of both carbon sequestration and biodiversity recovery while improving livelihoods.

Landowners, occupiers and managers with extensive landholdings have a crucial role to play as land management decisions affect the ability of different habitats to absorb and store CO₂. The Woodland Carbon Code and the Peatland Code are accredited offsetting standards and provide essential guidance.

Individuals with a small patch of land such as a garden can plant trees and create ponds and marshy areas, and can help with practical work on nearby green spaces such as parks, wildlife areas, nature reserves and local rewilding areas.

Conclusions

Over the last 30 years, and particularly in the last 2 years, governmental and public consciousness of the climate emergency has grown significantly. However, rapid reduction of greenhouse gas emissions is urgently needed to halt the ongoing rise in global heating. Initial efforts by individuals and organisations must concentrate on eliminating or reducing CO₂ from their operations and activities. Subsequently, CO₂ emissions must be reduced by using renewable energy, improving energy efficiency and making behavioural changes. Finally, unavoidable emissions of CO₂ require the removal of equivalent amounts of CO₂ from the atmosphere as fast as the CO₂ is added, each and every year. Achieving net zero by 2030 is a real contribution to the need to restrict global heating to 1.5°C above preindustrial levels (Box 1).

Carbon offsetting is complex and can be seen as a controversial issue, as shown by the online opinions of Greenpeace, Friends of the Earth, Greta Thunberg and George Monbiot. Nature-based offsetting solutions can deliver CO₂ reductions and enhance the stocks of natural assets and the ecosystem services they provide and deal directly with the biodiversity crisis. Integrated approaches are required and nature-based solutions must deliver multiple benefits. Well-planned and effectively implemented offsetting schemes, combined with verification and certification, need to deliver offsetting now rather than in the future.

Future action is not an option, real-time offsetting strategies are needed now. The best action is to stop emitting greenhouse gases.

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Acknowledgements

This article has been greatly improved through comments from many colleagues. The photographs were generously provided by Stephen Barlow and by Lewis Michael Jefferies/WWF-UK through Ben Jones (Project Seagrass). Bev Knowle has been a rigorous and skilful editor.