



Flood and Coastal Erosion Risk Management Research Programme

Achieving net zero - a review of the evidence behind potential carbon offsetting approaches

This project reviewed the evidence behind carbon offsetting and looked at a wide range of different offsetting approaches which could be used in the UK. This evidence base will be used to inform the development of the Environment Agency's carbon offsetting strategy.

Background

The UK has set a target to achieve 'net zero' carbon emissions by 2050. 'Net zero' means achieving a balance between the amount of greenhouse gas emissions (GHGs) produced and the amount removed from the atmosphere. To achieve this, annual emission rates will need to be cut to less than 90 million tonnes (Mt) of CO₂e (carbon dioxide equivalent) by 2050 (2019 levels = 260 Mt CO₂e).

The Environment Agency's own net zero target, set for 2030, includes reducing emissions by 45%, and using best practice carbon offsetting techniques to address remaining emissions.

Method

We reviewed the evidence behind 17 different carbon offsetting approaches which included mainly nature based solutions and a smaller number of built environment approaches. Each approach was reviewed against the following criteria:

- Readiness for implementation
- Speed and scale
- Permanence (impact is not reversed)
- Leakage (reduction in emissions in one area leads to increase in another)
- Additionality (reductions that would not have happened otherwise)
- Co-benefits
- Confidence in the science
- Measuring impact
- Risks and barriers
- Costs

We scored each of the 17 offsetting approaches using a red, amber and green rating system, enabling them to be ranked from high to low based on how extensively they met each of the criteria:

1. Woodland creation
2. Upland peat restoration
3. Biochar
4. Hedges and trees outside of woodlands
5. Household insulation
6. Household low carbon heating
7. Soils management: pasture
8. Soils management: arable
9. Enhanced weathering
10. Lowland peat restoration
11. Floodplain restoration
12. Saltmarsh restoration
13. Grassland
14. Seagrass restoration
15. Kelp restoration
16. Constructed wetland
17. Other built environment measures (such as renewable electricity consumption, reducing water consumption, building with timber and low carbon transport)

This review will help us understand which carbon offsetting approaches we may want to focus on the most when developing our offsetting strategy.

Results

We found that:

- all the approaches reviewed have strengths and weaknesses in offsetting carbon emissions
- some of the approaches remove GHGs from the atmosphere, others reduce the rate of GHG emissions, and some progress from reductions to removals over time
- different offsetting approaches remove GHGs from the atmosphere at different rates and they scored differently across the implementation factors
- to achieve true net zero, only carbon offsetting projects that remove GHGs can be used
- there are currently only 2 accredited carbon offsetting standards in the UK – the Woodland Carbon Code and the Peatland Code
- more research and development may be needed in the future to expand the number of nature-based offsetting schemes that are available

Outputs

The project has produced a report summarising the review findings and an infographic of each of the offsetting approaches.

Next steps

The Environment Agency will use the outputs from this research to shape the development of its own carbon offsetting strategy.

This summary relates to information from project FRS19212, reported in detail in the following output:

Report: FRS19212

Title: Achieving net zero - a review of the evidence behind potential carbon offsetting approaches

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