



postnote

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Voluntary Carbon Offsets

Carbon offsetting involves calculating a person or entity's greenhouse gas emissions and then purchasing 'credits' from emission reduction projects that have prevented or removed the emission of an equivalent amount of greenhouse gas elsewhere.¹ The voluntary carbon offset market is growing at a rapid rate. However, there is considerable debate over both the merit of carbon offsets themselves, and the different types available. This POSTnote reviews the arguments over the availability of offset programmes, describes the carbon market and highlights some of the defining characteristics of a carbon offset.

Background

As climate change has become more widely discussed, some people are looking for ways to reduce their carbon footprint. Carbon offsetting is increasingly popular. There are many companies, in the UK and worldwide, that seek to sell carbon credits to consumers (who have no compulsion to purchase them). This is the voluntary carbon offset market. From 2007, emissions from UK parliamentary air travel are to be offset through the government's Carbon Offsetting Fund.

The effectiveness of carbon offsetting

The effectiveness of carbon offset schemes for reducing climate impacts is the subject of confusion and debate. Most scientists agree that the starting point to deal with climate change is to move towards a low carbon economy. It is recognised that attempting to compensate for 'business as usual' with offsets will not lead to this. This is because it is physically impossible to offset the billions of tonnes of greenhouse gases emitted worldwide. There is also conjecture that the availability of the option of offsetting may well hinder behavioural change to a low carbon economy.² On the other hand, it has been suggested that carbon offsetting schemes can involve benefits beyond removing greenhouse gases from the atmosphere, such as providing opportunities for people and organisations to learn about and to raise awareness

of their carbon footprints. It is also possible that schemes can contribute to sustainable development goals in developed and developing countries.

The Carbon Trust is an independent company established and funded by the government to help the UK meet its climate change obligations. The Trust states that the most effective and environmentally sound way to address an organisation's carbon footprint is:

- firstly, to focus on direct emissions, reducing the in-house carbon footprint by implementing cost-effective energy efficiency measures;
- secondly, to look at reducing indirect emissions, working with other organisations up and down the supply chain to reduce emissions;
- then, if appropriate, to consider developing an offset strategy, ensuring that only high quality offsets are purchased from verified projects that genuinely create emissions reductions.³

The types of carbon offsetting

Carbon offsets are produced from projects that either avoid or reduce greenhouse gas emissions or sequester them before emission. Offset projects may either be technology-based or land use based. Examples of technology-based offset projects include:

- Switching fuels from oil or diesel to natural gas. Natural gas produces lower CO₂ emissions per unit of energy than oil or diesel.
- Recovering methane from landfills. A molecule of methane has a higher warming impact than one of CO₂. Burning methane to produce CO₂ reduces the global warming effect by 96%.
- Energy efficiency, for example, installing low energy lighting or improving industrial energy efficiency.
- Renewable and other low-carbon energy such as photovoltaic, wind, biomass, hydro and nuclear electricity replacing fossil fuels.

Land-use offset projects include:

- Preventing deforestation and peatland degradation. Since 1990 at the global level, carbon dioxide emissions from degraded peatlands have exceeded those from deforestation.⁴
- Reducing carbon loss from forests via changes in harvesting regimes, and controlling fire and pest outbreaks.
- Reforestation – the forestation of cleared land which was previously forested.
- Afforestation – the forestation of land not previously forested.
- Revegetation – establishing new non-forest plant cover.
- Sequestration of greenhouse gases in agricultural soils through change in tillage practices.⁵

The carbon market

There are two markets for carbon offsetting – the regulated or compliance market and the voluntary market. The compliance market is governed by the United Nations Framework Convention on Climate Change (UNFCCC), with an internationally agreed framework of regulation.

The Kyoto Protocol (part of the Framework Convention on Climate Change) established mandatory targets for greenhouse gas emission limitations for those developed countries which ratified the Protocol. It established three mechanisms designed to help Annex 1 Parties (the industrialised countries with legally binding targets) to cut the cost of meeting their emission targets:

- The Clean Development Mechanism (CDM);
- The Joint Implementation Mechanism;
- International Emissions Trading.

Together these mechanisms constitute the framework of the global carbon market, allowing carbon credits from offsetting to be used by industrialised countries to demonstrate compliance against their Kyoto targets, as detailed in Box 1.

In contrast, the voluntary carbon offset market has developed separately from government targets and policies. Carbon credits produced in this non-regulated environment are referred to as Verified Emission Reductions, or sometimes Voluntary Emission Reductions (VERs). No universally accepted regulations or protocols govern them. It is important to note that a voluntary offset provider may sell credits from both the regulated and the voluntary markets.

Voluntary carbon offset projects have tended to be smaller scale (less than 15,000 tonnes CO₂ equivalent per annum) often, but not exclusively, located in developing countries. In the majority of cases, these small scale projects are economically unattractive for the compliance market due to the high transaction costs involved in satisfying its criteria. By the conclusion of the first commitment period of the Kyoto Protocol (2012), more than 1.9 billion certified emission reductions are expected from CDM programmes. The size of the

voluntary offsetting market is difficult to quantify, but is much smaller than the regulated market.

Box 1. The Kyoto Protocol Mechanisms

The Clean Development Mechanism

This provides for developed countries to implement projects in developing countries that either reduce emissions or absorb carbon through afforestation or reforestation activities. These projects receive emission credits, called Certified Emission Reductions (CERs).

Joint Implementation

This mechanism is based on the same principles as CDM, but involves an Annex 1 party implementing a project in another Annex 1 party. Credits generated are called Emission Reduction Units (ERUs).

International Emissions Trading

Each country is allocated an emissions allowance based on its emissions limitation target. Emissions trading provides for Annex 1 parties to acquire units from other Annex 1 parties and use them towards meeting their emissions targets. Another example, but separate from the Kyoto Protocol, is the EU Emissions Trading Scheme. This established EU Allowances which are tradable.

CERs, ERUs and EUAs all represent the same thing – the right to emit 1 tonne of CO₂ equivalent. These different credits are transparent and tradable.

Defining characteristics of a robust carbon offset

According to the Carbon Trust, there are five main characteristics of carbon offsets that impact on their integrity and credibility. These are:

- **Additionality** - the defining concept of a carbon offset. To qualify as an offset, the greenhouse gas reductions achieved by a project need to be in addition to what would have happened if the project had not been carried out. Demonstrating additionality can be difficult. There is no single test for it. Tests are also to some extent subjective, as it is impossible to establish with certainty what would have happened in the absence of a particular project. The UNFCCC has developed a toolkit to help determine additionality, (see Box 2).
- **Verification** - monitoring and verification of emission reductions guarantees that the reductions claimed by a project have actually been achieved.
- **Permanence** – avoidance of any potential reversibility of emission reductions or sequestrations.
- **Leakage** – broadly, any increases or decreases in emission that take place beyond the project boundary. For example, a project that prevents deforestation in one area may cause the activities to migrate to another area.
- **Double counting and ownership questions** - this happens when the ownership of the carbon offset is contested. Double counting should be avoided, and offset sellers should have a registry where credits are accounted for and retired. Double counting can also happen at the national level, where voluntary reductions are counted towards national mandatory targets.

Box 2. Additionality

Additionality is defined by the UNFCCC as meeting the following criteria:⁶

- Legal and Regulatory Test. If the project is implemented to fulfil official policies, regulations or industry standards, it cannot be considered additional. If the project goes beyond compliance, it might be additional but more tests are required to determine that. For example, an energy efficiency project implemented because of its cost savings would not be additional.
- Financial Test. This test assumes that a project is additional if it would have a lower than acceptable rate of return without revenue from carbon offsets.
- Barriers Test. This looks at implementation barriers such as local resistance, lack of know-how, and institutional barriers.
- Common Practice Test. If the project employs technologies that are very commonly used, it might not be additional because it is likely that the carbon offset benefits do not play a decisive role in making the project viable.

short term mitigation strategy in regions where large carbon pools are at risk of disturbance.

- Sequestration management to increase the sequestration and storage of carbon in the forest or in wood products. Examples include increasing the productivity of forests and afforestation.
- Substitution management includes measures to substitute carbon emissions from fossil fuels. Examples include using wood biomass fuels or using wood as a building material instead of other materials which use more energy.⁷

Trees also affect climate in other ways, for example by altering the reflectivity of the land surface and by changing the amount of water vapour released to the atmosphere. The contributions of these other positive and negative impacts on the local and global climate are not fully understood, leading to an element of uncertainty when assessing the overall impacts of forestry schemes.

Issues

Emissions calculation

To offset emissions, consumers need to know the quantities of greenhouse gases emitted by their activities. Many offset providers have emissions calculators on their website. However, these may vary in assessing emissions for a given activity. For instance, Table 1 shows how three different offset providers assessed a return flight from London Heathrow to Sydney.

Table 1: Flight emissions calculations (London to Sydney return) and cost to offset from three different offset providers

Calculator	CO ₂ Emissions (tonnes)	Cost to offset (£s)
The CarbonNeutral Company (uses DEFRA emission factors)	1.90	14.25 to 20.42
British Airways / Climate Care	3.84	28.83
Atmosfair	12.88	177.00

Calculating greenhouse gas emissions may appear simple but can be difficult in practice. In many areas, there is a lack of reliable basic data relevant to contemporary lifestyles. The science behind calculating carbon dioxide emissions from aviation is particularly subject to considerable debate. To assist the standardisation of greenhouse gas emission calculations, on 20th June 2007 the government released a standard emissions calculator on the DEFRA website.

Carbon offsetting and forestry

Forests, and in particular tropical forests, play an important role in the global carbon budget because they can be either sinks or sources of atmospheric carbon. Any activity that affects the amount of biomass in vegetation and soils has the potential to sequester carbon from, or release carbon into, the atmosphere.

Carbon mitigation strategies in forest management can be grouped into three different categories:

- Conservation management to prevent emissions from existing forest carbon pools. This is the most effective

Removal of carbon dioxide from the atmosphere by forests and other land uses as a means to mitigate climate change has proved controversial. For the first commitment period of the Kyoto Protocol (2008 – 2012), the Clean Development Mechanism permits only afforestation and reforestation to be eligible for generating Certified Emission Reductions. Emission reductions achieved through conservation management projects do not qualify. Negotiations currently underway for the second commitment period include consideration of allowing conservation management to be eligible for certification.

Permanence

Permanence refers to the ability of a project to maintain the reductions achieved over time. By nature, projects based on emission reductions have a permanent impact while those based on sequestration may not. For example, carbon sequestered in a newly created forest can be lost in the future due to deforestation or fire.

Forest carbon sequestration projects, although possibly temporary by nature, do offer some benefits. They may also buy time for technological progress in climate change abatement.⁸ Agricultural and forestry sequestration projects may also provide incentives to grow more biomass, providing a resource of renewable energy and building materials.

The Carbon Trust states that offset providers should provide some form of guarantee that any emission credits sold are maintained over time. This could take the form of an insurance policy, where an underperforming offset project is either replaced by credits from other projects from the seller's portfolio, or credits are acquired in the market to cover the shortfall. The provision of guarantees assumes that the offset provider is still in business and has not gone into liquidation.

Pros and cons of different offset types

Consumers have numerous carbon offsetting programs to choose from, and selecting one can be difficult. In a

review of offsetting projects, the Tufts Climate Initiative, part of the Tufts University in the US, concluded the following:

- Moving away from fossil fuel based electricity production to renewables is important for the long-term protection of the global climate. On this basis, renewable energy offsets were highly recommended.
- Energy efficient products or systems use less energy to perform the same task. However, because of the decentralised nature of these projects, monitoring and evaluating them can be challenging. Establishing a baseline and estimating emission reductions for small decentralised projects is difficult. Nevertheless, they have good potential to decrease greenhouse gas emissions. The Tufts Climate Initiative concluded them to be among the best offset projects.
- There are more uncertainties with sequestration. Acknowledging these difficulties, the Initiative concluded that the exact tonnes of carbon sequestered might be less important than considering which projects help the transition to a low carbon economy. While both energy efficiency and renewable energy projects promote a more efficient, low carbon economy, sequestration projects do not achieve this automatically.⁹ However, other scientists disagree with this, and emphasise that in principle, there is a strong link between developing a biomass resource and reforestation or revegetation initiatives. Carbon sequestration through revegetation could provide the renewable biomass materials and fuels needed for the future.¹⁰

Offset standards and policy responses

One of the main criticisms of the voluntary carbon offsetting market is the lack of agreed standards or protocols to ensure that a consumer's investment actually results in an offset. In response to this, one of the main trends in the voluntary offsetting industry is a move towards using more of the regulated market compliance instruments. Under the CDM standard, additionality is proved using the additionality tool kit (see Box 2), and baseline methodologies must be approved by the CDM Executive Board. An accredited third party verifies that the claimed emission reductions are real. The CDM standard provides a high level of integrity, but with matching transaction costs. Consequently, CDM projects tend to be limited to medium to large projects generating more than 50,000 tonnes of CO₂ credits.

In addition to the CDM standard, there are now at least five different standards developed by different stakeholders that could be used to ascertain the veracity of a voluntary carbon offset project. For example, The Climate Group is finalising the Voluntary Carbon Standard, which creates tradable Voluntary Carbon Units with a registry managed by the Bank of New York. Version I of the Standard has been in use since March 2006, and the Group hopes to launch the revised standard in late 2007. The environment group WWF and others established The Gold Standard, in which only renewable energy and energy efficiency projects are eligible. The CDM Gold Standard applies to CDM projects

with guidelines to prove the 'sustainable development' component. The Voluntary Gold Standard also has an emphasis on 'sustainable development', and provides simplified procedures for small voluntary offset projects.

In January 2007, DEFRA released a proposal to establish a voluntary Code of Best Practice for the provision of carbon offsetting to UK customers. Under this, only offset credits from the regulated market would be accepted as 'best practice'. These credits include Certified Emission Reductions and European Allowances associated with the EU Emissions Trading Scheme. This has created some tension in the voluntary offset industry.

The House of Commons Environmental Audit Committee is also conducting an inquiry into the voluntary offsetting market, with regulation as a strong theme of the inquiry.

Overview

- Voluntary carbon offsetting involves calculating an individual or entity's emissions and then purchasing credits from emission reduction projects.
- Individuals and entities have been encouraged to reduce their greenhouse gas emissions in a cost effective manner before investing in carbon offsetting projects.
- The voluntary market is currently supplied by credits from regulated and unregulated carbon reduction projects.
- The government has proposed a Code of Best Practice for the voluntary carbon offsetting industry.

Endnotes

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