



Placing a value on carbon

Background

When pricing a product, process, or service, the emissions produced, and their impact, are not accounted for in the pricing structure. Emissions and air pollution, and their impacts to health, environment, biodiversity, and climate change do not have an economic value. This means that, for example, a production facility that releases air pollutants into the local atmosphere does not automatically pay for the health impacts caused to those living near the facility. These impacts are called external costs, whereby an impact occurs as the result of an activity, but that activity does not pay for the impact. They can be both negative and positive, though generally we refer to negative externalities (negative impacts).

This technical advice note aims to offer a comprehensive overview of the economic value placed on carbon emissions, with specific reference to UK policy frameworks. We will explore the concept of externalities, detailing how emissions have historically been left out of economic accounting.

Placing a cost value on these emissions or impacts aims to provide a means of including these external impacts within the traditional economic accounts. It enables the 'polluter pays' principle – that those causing the pollution¹ should be responsible for paying for the negative impacts that pollution is causing. This additional economic aspect also aims to change consumption and investment

¹ Naming those responsible for pollution is a complex topic (for example should it be the manufacturer, or the demand for the product?), which is out of the scope of this advice note.

² To put WTP into context, imagine a local community faced with the prospect of a new major road being built nearby. A WTP study might assess how much each household is willing to pay

behaviour, promoting a shift to more sustainable methods.

Valuing emissions

The principle behind placing a value on emissions is to determine the level of damage caused by the pollutant so that in theory the polluter would pay to rectify the damage. There are many methodologies used to determine these values, for example willingness to pay (WTP) defines a price by the amount of money a study group would be willing to pay to prevent or solve an issue². Often these methodologies rely on subjective measurements, especially with regard to environmental impact. For health impacts, there is objective data which can be used, for example medical costs, care costs, and loss of income. Different methodologies give different values for emissions, so there needs to be standardisation where these values are used in practice.

The UK Government uses [greenhouse gas \(GHG\) emissions values](#) (or 'carbon values') to value the impact of policy on GHG emissions. These are used to assess the impact a policy change might have on the environment, generally used through a cost-benefit analysis framework. The UK Treasury [Green Book](#) gives guidance on the overarching policy and project appraisal framework, including carbon valuation to achieve best public value. These carbon values are based on the marginal abatement costs³ required to meet our national climate change targets – reaching net zero

to prevent the development proceeding, thereby giving an economic value to the environmental and health impacts they seek to avoid.

³ Marginal abatement costs are the costs of reducing one unit of pollution (generally one tonne of carbon dioxide equivalent).



emissions by 2050, within a series of interim targets, consistent with the [Paris Agreement](#).

Carbon values differ from ‘carbon prices’, which represent the actual carbon price used in a relevant market. For example, the UK Emissions Trading Scheme (ETS) sets an annual [carbon price](#) which is based on the market price of auctioned carbon allowances.

The UK Government also issues damage costs to evaluate changes to air quality. [This guidance](#) covers nitrogen oxides (NO_x), sulphur dioxide (SO₂), ammonia (NH₃), volatile organic compounds (VOCs), and particulate matter PM_{2.5}.

UK policy

An [Emissions Trading Scheme](#) (ETS), is where a limit is set on the amount of greenhouse gases allowed to be emitted. Within this limit, businesses covered by the ETS must buy an ‘allowance’ for their emissions, which can be bid for from the issuing authority or traded between businesses. The emissions limit is then reduced year on year, and the resulting cost of carbon (or cost of ‘allowances’) increases. Until 2021, the UK was part of the EU ETS, but now has its own [UK ETS](#), which covers energy intensive industries, power generation, and aviation within the UK, between the UK and Gibraltar, and between the UK and the EU. The strength of an ETS depends on the level of allowances permitted, and the EU ETS has faced [criticism for over-allocating permits](#), but has nonetheless led to ‘[statistically significant](#)’ emissions reduction (around 10% between 2005 and 2012 in phases 1 and 2).

There are several ‘green levies’, or ‘environmental taxes’ [within the UK](#): the climate change levy on non-domestic electricity, fuel duty, renewable energy obligations, air passenger duty, plastic packaging tax, landfill tax, and aggregates levy. However, the money collected from these schemes becomes part of the [total UK tax](#)

[revenue](#), and is not ring fenced for rectifying the damage caused by the pollution accounted for. This means that whilst the taxation tackles the emitting side, by placing penalties on high emissions, it does not directly address the damage caused by externalities.

Using emission valuation internally

Even if there is no formal payment of carbon taxes, they can be used internally as a means to address your organisation’s external impact on health and the environment. You could implement a carbon tax onto your processes, with the money collected being used to purchase more sustainable or zero-emission equipment. For example, you could place a £0.05/mile levy on your diesel vehicles, with the collected money going towards the purchase of electric vehicles and charging infrastructure.

Research by the Carbon Disclosure Project in 2020 found that there are more than [2,000 large](#) companies globally that apply an internal carbon pricing scheme. One example, [Unilever](#), charges its business units a carbon tax based on the units Scope 1 and Scope 2 emissions⁴, and uses the funds to support on-site renewables, waste reduction, and energy and water saving projects.

Placing an economic value on emissions, even if no money is being exchanged (called a ‘shadow price’), can also be a helpful means of illustrating the extent of the impact – for example including these costs on your financial statements shows the extent of harm being made in comparison to your income and outgoings. This may represent a more meaningful way of talking about pollution than in terms of weight, which is difficult to conceptualise.

Summary

Negative impacts to health, the environment, biodiversity, and climate change, are externalities – caused by unabated pollution,

⁴ Scope 1 emissions are those which are the direct responsibility of the entity (for example burning fuel in a combustion engine vehicle), Scope 2 are those included in the

direct supply of goods and services purchased by the entity (for example electricity generation to power an electric vehicle).



on which there is no traditional economic value placed to account for these impacts. Valuing emissions aims to undo and redress these negative externalities, by illustrating how much it costs to pollute, maybe not to the polluter, but to the external environment.

The UK has both a 'shadow' valuation for carbon (illustrative, but not collected monies), used to include environmental and health impacts into decision-making processes, and 'real' costs which are part of environmental taxation policies and the Emissions Trading Scheme. These schemes aim to reduce pollution and its negative impacts, but do not necessarily directly address the negative impacts being made.

Research from the [Organisation for Economic Cooperation and Development](#) (OECD) shows that the use of carbon pricing through taxes and emissions trading is increasing worldwide (data for 71 countries), covering more than 40% of global GHG emissions in 2021 (up from 32% in 2018). Carbon pricing schemes have shown to be an effective instrument for reducing emissions, provided carbon prices are sufficiently high to support change. Your organisation could choose to use an internal carbon costing mechanism in order to implement and improve emissions reduction actions, providing a financial incentive and means of identifying improvements made in a tangible way.

Find out more about how the Welsh Government Energy Service can help your community enterprise or public sector organisation:

Website: [Click here](#) | Email: enquiries@energyservice.wales



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