Grantham Research Institute on Climate Change and the Environment

Centre for Climate Change Economics and Policy

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Policy brief
Global lessons for the UK in carbon taxes

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Headline issues

- Putting a higher price on carbon is essential for the UK to cost-effectively meet its 'net-zero' emissions target and make polluters pay.
- A carbon tax would price carbon effectively, either alongside or instead of carbon trading under the EU Emissions Trading System.
- A carbon tax should be fair, rise gradually over time and have transparent, well-communicated rules about the use of revenue.

Summary

The global experience with carbon taxes is growing although less than 6 per cent of global greenhouse gas emissions are taxed currently. Some countries have taxed carbon for more than 25 years, but most schemes are more recent. Where emissions are taxed, this has helped to lower emissions, even though tax rates are often low or subject to significant exemptions.

Taxing carbon can be politically controversial but it is possible to design a carbon tax that is both effective and publicly acceptable. To be effective in the UK, the tax level needs to be consistent with the country's new 'net-zero' emissions target. In most sectors, this means a starting point of around £40 per tonne of carbon dioxide by 2020. The tax should take into account complementary carbon policies (e.g. innovation support) and existing fiscal measures (e.g. taxes on transport fuels). To be credible, there must be clear rules, not subject to political pressure, on how the tax trajectory is adjusted over time.

To be publicly acceptable, the tax rate should start low and rise over time. That way, people can observe the environmental effectiveness of the tax and the manner in which revenues are redistributed. Tax revenues can be used to further enhance public acceptability, for example by cushioning socioeconomic side-effects via carbon dividends (direct payments to affected households), lowering other taxes or investing in additional ways to reduce emissions. It is essential for public acceptability that the use of proceeds is carefully explained, alongside information on the environmental, social and economic impacts of the tax.

Policy briefs provide analysis on topical issues, presenting specific recommendations to inform ongoing policy debates. Drawing on the Grantham Research Institute's expertise, they summarise either our research findings or the state of knowledge about a particular issue.

This policy brief has been written by **Josh Burke, Rebecca Byrnes** and **Sam Fankhauser**.

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Why a carbon tax?

Putting a price on carbon is an essential tool for reducing greenhouse gas emissions, and is achieved through either a carbon tax or emissions trading. In conjunction with other policies, a meaningful price on carbon ensures that polluters pay and emissions are cut at least cost. Compared with other policy interventions such as technology subsidies, carbon taxes have been shown to be more efficient and fair (Bassi et al., 2017).

Carbon pricing is particularly topical in the UK right now for two reasons. First, in June 2019 the UK committed to a statutory 'net-zero' emissions target by 2050, the first major economy to do so. A meaningful price on carbon that covers all sectors is essential for this target to have policy credibility. Second, as part of the Brexit process the UK has to revisit its main current carbon pricing mechanism, the EU Emissions Trading System (EU ETS), which covers about a quarter of UK emissions.

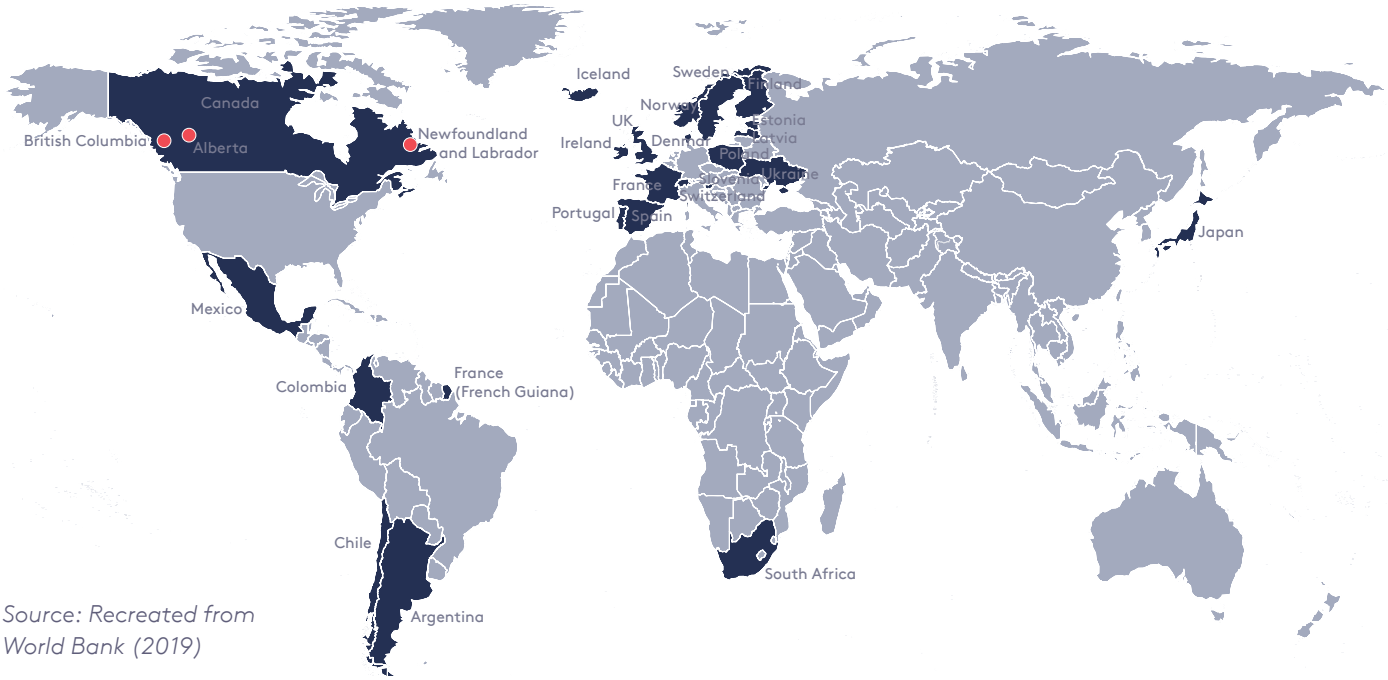
A carbon tax would be an effective way to price emissions not covered by the EU ETS. If continued association with the EU ETS is not possible after leaving the EU, a carbon tax would also be an effective way of pricing currently traded emissions. In such a case the UK should re-optimise its tax design, for example by expanding the proportion of emissions covered.

Global trends in carbon taxation

Despite the clear need to confront carbon emitters with the environmental cost of their actions, globally there were only 56 carbon pricing schemes in operation in July 2019. They are split equally between 28 carbon trading schemes and 28 national and subnational jurisdictions with a carbon tax (Figure 1). The 28 tax schemes cover just 5.6 per cent of global greenhouse gas emissions (World Bank, 2019).

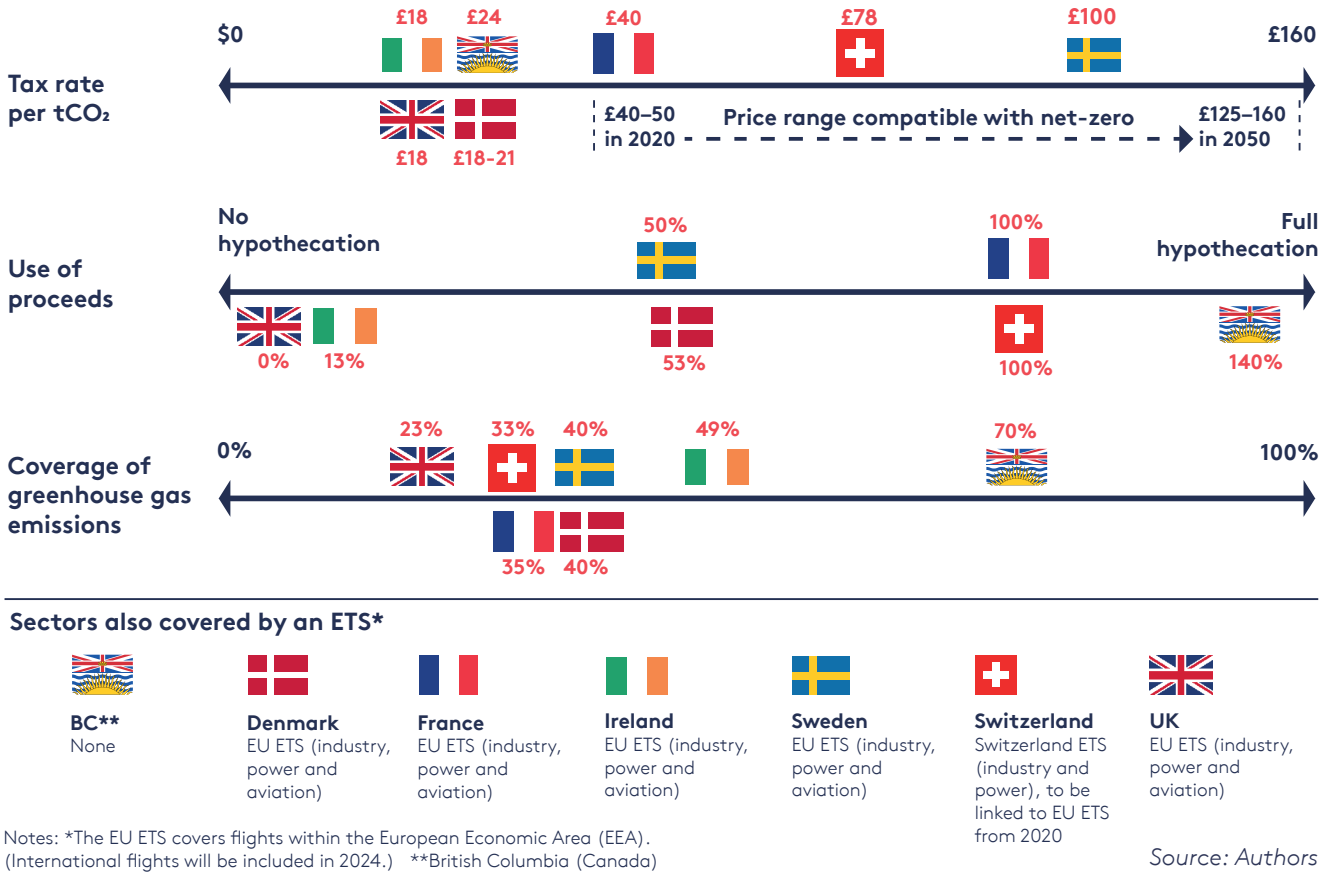
The Nordic countries (Denmark, Sweden, Finland and Norway) have taxed carbon since the early 1990s,

Figure 1. Regional, national and subnational carbon taxes around the world, July 2019



Source: Recreated from World Bank (2019)

Figure 2. Example carbon taxes: classification across three dimensions



Notes: *The EU ETS covers flights within the European Economic Area (EEA). (International flights will be included in 2024.) **British Columbia (Canada)

Source: Authors

but most tax schemes are more recent. No fewer than five new tax schemes were adopted between January 2018 and July 2019. Further initiatives are planned. In June 2019 the Netherlands announced plans to impose a carbon tax on industrial firms included in the EU ETS as well as a price floor for its power sector.

The following analysis focuses on those jurisdictions that have opted for a carbon tax scheme rather than emissions trading.

Differences in tax design

Carbon is being taxed in many different ways and in a variety of socio-political contexts around the world. Carbon taxation schemes can be classified along three dimensions:

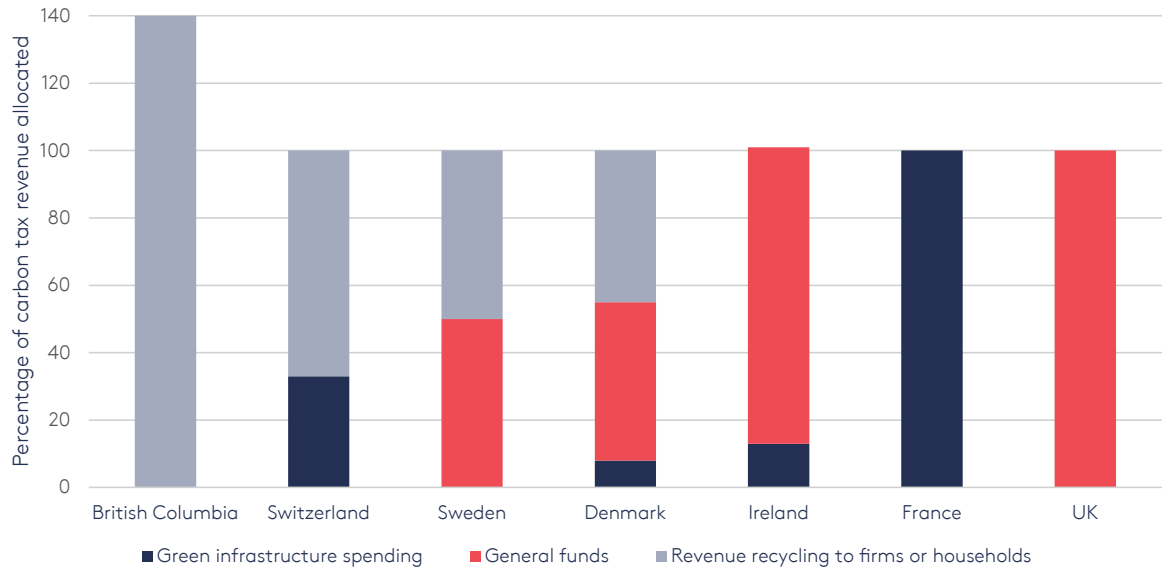
- The level of the tax
- The share of emissions covered
- The use of tax revenues

Significant variation exists along all three dimensions (see Figure 2 for a comparison of taxes from seven jurisdictions that present a broad spread across the dimensions). For example, in Sweden the share of emissions covered is 40 per cent and in the Canadian province of British Columbia it is 70 per cent. In the UK, the Carbon Price Support – an upstream tax paid by fossil fuel generators – covers 23 per cent of emissions.[1] In addition, UK industry faces a separate downstream tax known as the Climate Change Levy.

Disparities are also apparent when examining tax levels. Poland (not shown in Figure 2) has a carbon price of just PLN 0.3 (£0.06) per tonne of carbon dioxide (tCO_2). In contrast, the Swedish carbon tax is Kr1,180 (£100.30) per tCO_2, although with considerable exemptions. The proposed Dutch carbon tax would start at €30

1. The Carbon Price Support was introduced for the power sector to supplement the EU ETS price, requiring UK power generators to pay a minimum carbon price. The Government recently decided to cap the Carbon Price Floor at £18.08 per tonne of carbon dioxide-equivalent (€20.40) till 2021.

Figure 3. Allocations of revenue from seven example carbon taxes



Source: Authors using data from Carl and Fedor (2016)

"There are significant differences in the way carbon tax schemes use their tax revenues; the UK's Carbon Price SUpport is least prescriptive"

(£26.92) per tCO_2 in 2021 and rise linearly to €125–150 (£112.18–134.61) per tCO_2 in 2030. The global average across all jurisdictions is £18.07 per tCO_2. A recent report by the Grantham Research Institute argues that a carbon price that is consistent with Britain's net-zero target would have to start at around £40 per tCO_2 in most sectors (and would need to be even higher if not accompanied by complementary policies such as innovation funding, standards and training) (Burke et al., 2019).

There are significant differences in the way carbon tax schemes use their tax revenues. The UK's Carbon Price Support is least prescriptive, treating all proceeds as general tax revenue: that is, allowing the Exchequer to decide how to spend it. Most other schemes include earmarking (or 'hypothecation') rules on the use of revenues (see Figure 3).

An intriguing feature of British Columbia's carbon tax is that it returns significantly more money than it generates. This is one of several innovative measures in the province's scheme that were put in place to make the tax politically more acceptable (see Box 1).

Global lessons from carbon taxation

Existing tax schemes provide important lessons for the design of a possible new carbon tax for the UK.

Lesson 1: Carbon taxes reduce emissions. Evaluation of other existing carbon taxes, particularly of the long-established schemes in the Nordic countries, shows that they have been successful in reducing greenhouse gas emissions. However, the emissions cuts have not been as steep as what will be required under a trajectory to net-zero. In part, this has to do with relatively low tax levels and/or widespread tax exemptions (Bjørner and Jensen, 2002; Bruvoll and Larsen, 2004; Lin and Li, 2011).

In the UK carbon taxation through the Carbon Price Support was an important driver in the demise of coal. Analysis suggests that the Carbon Price Support caused coal generation to drop by 73 per cent between 2013 and 2017 (Aurora, Energy Research, 2018).

Box 1. Carbon tax revenue recycling in British Columbia

In 2008, the Canadian province of British Columbia (BC) introduced a carbon tax and applied it uniformly to all fossil fuels within its borders. The tax applied to approximately 70 per cent of greenhouse gas emissions with the only major exemptions being inter-jurisdictional shipping and flights (journeys between BC and the rest of Canada). The tax rate started at CAD$8 (£6.11) per tCO_2e, rising to $30 (£18.34) per tCO_2e in 2012, and $35 (£21.60) in April 2018. In April 2019 it was increased from $35 (£21.40) to $40 (£24.45). The tax rate will now increase each year by CAD$5 (£3.06) per tonne until it reaches $50 (£30.57) per tonne in 2021 (exchange rate correct as of 23 July 2019).

Empirical research suggests that the tax has reduced emissions in the province by 5–15 per cent, while having negligible effects on economic performance (Murray and Rivers, 2015).

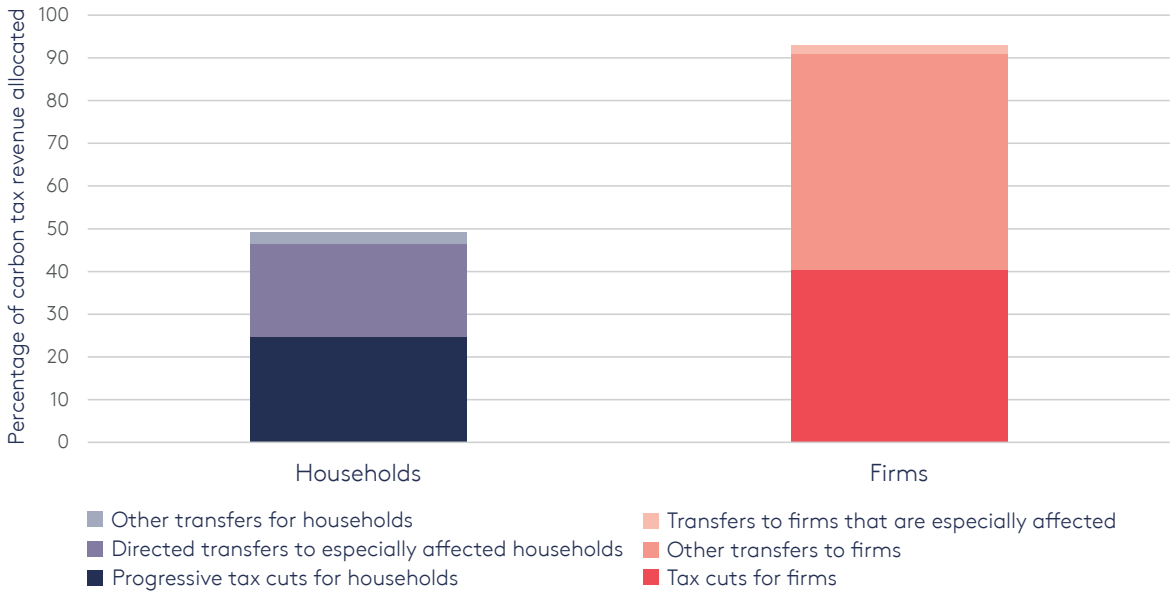
The distributional impact of a tax depends on who it is levied on and how revenues are redistributed. To counterbalance the regressive nature of the carbon tax itself, all revenues in BC were recycled and used to offset potential regressive effects. Revenues were recycled to households and firms in the form of tax cuts and transfers to low-income households and trade-exposed industry. In fact, BC now returns significantly more money than the tax generates.

In 2015, 120 per cent of tax revenues were allocated to firms and households. This grew to 140 per cent in 2018, with firms receiving an equivalent of 90 per cent and households 50 per cent. This was achieved by decreasing income taxes beyond what would be necessary to achieve revenue neutrality. Figure 4 below provides a further breakdown.

In many ways the BC carbon tax is a 'textbook' policy. It has wide coverage and few exemptions, prices were phased in and raised slowly (Duff, 2008), with a price freeze from 2013–18 giving business and individuals time to adjust, and the tax is not revenue-raising. The use of the revenues is transparent and clearly communicated by the BC Ministry of Finance, which is required to prepare a three-year plan for recycling carbon tax revenues every year. The plan is then presented to the Legislative Assembly for review and approval.

This combination of measures has been crucial in making the carbon tax politically acceptable. Murray and Rivers (2015) show that despite large increases in tax rates, public support for the tax has grown, surpassing 50 per cent in 2011, three years after implementation.

Figure 4. Allocations of British Columbia's carbon tax revenue



Source: Authors using data from BC's Budget and Fiscal Plan 2018/19

"Making carbon taxes more politically acceptable is a key precondition for more stringent and effective climate action"

Lesson 2: Taxing carbon is more difficult politically than other climate policies such as subsidies and regulation. This has been most visible in the backlash to the French carbon tax by the *Gilets Jaunes* movement, although it is worth noting that those protests were primarily due to bad tax design as it was coupled with tax rebates for high-income households. Carbon tax escalators are often aborted, or schemes later rescinded (as happened in Australia, for example), because of political difficulty. Making carbon taxes more politically acceptable is thus a key precondition for more stringent and effective climate action.

There are several reasons for public resistance to carbon taxes (Carattini et al., 2018). Often, people suspect the government's main motivation to be fiscal – raising revenues – rather than environmental – reducing emissions. They may doubt that despite evidence to the contrary, carbon taxes are effective in reducing emissions. Consequently, they consider their personal burden too high, even if they agree with the environmental objective. More broadly, people feel that carbon taxes fall disproportionately on low-income households.

Lesson 3: Public acceptability can be increased through a combination of smart design and clear communication. British Columbia is a good example of an innovative tax design that has sought to achieve this (see Box 1). However, conventional fiscal thinking – where all proceeds are treated as general tax – had to be abandoned to foster greater political acceptability and durability. The careful use of tax revenues can turn a regressive tax into a progressive, and therefore more palatable, policy (see Box 2).

Experts (Carattini et al., 2018; Klenert et al., 2018) offer three ways in which carbon taxes can be made more acceptable:

i. Careful communication. Successful tax schemes are very carefully communicated and feature regular updates on the use of proceeds and the environmental, social and economic impacts of the tax.

ii. Phasing in over time. Together with good communication, phasing in a carbon tax can build familiarity with the scheme ahead of higher tax rates.

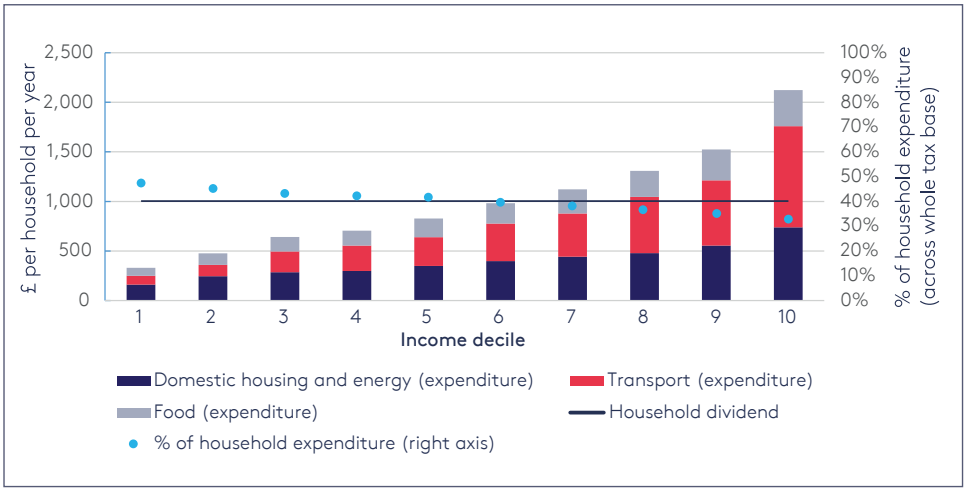
iii. Earmarking carbon tax revenues. Transparent earmarking can help to overcome suspicions about the social, economic and environmental impacts of the tax. Tax revenues may be used to finance additional climate change mitigation (increasing the environmental effectiveness of the scheme), to cushion the social or economic impact of the tax (increasing its fairness), or to make the scheme revenue-neutral by lowering other taxes or offering a 'carbon dividend' (overcoming suspicions about the government's fiscal motives).

What balance is appropriate between these options depends on the political context. If the greatest obstacle is building a broad coalition of citizens, then direct transfer to citizens in the form of a dividend may be a good option. Where genuine competitiveness concerns present the largest barrier, compensating firms through tax rebates may be preferable, although border carbon adjustments could fulfil a similar function. Moreover, as the share of global greenhouse gases covered by a price increases, competitiveness concerns reduce.

Box 2. Illustrative impact of a revenue-neutral UK carbon tax and dividend

Carbon taxes can be both regressive and progressive. Tax design will dictate the outcome. The tax itself is likely to be regressive: because poorer households spend a larger proportion of their income on carbon-intensive goods like energy, transport and food, they will be harder hit by a carbon tax than better-off households. However, tax revenues can be recycled in a way that benefits poorer households mo re, thus ensuring the overall outcome is progressive.

Figure 5. Illustrative tax payments and revenues (£) by income decile[2]



Source: Gough et al. (2012) and authors' calculations

One way to achieve a progressive outcome is by recycling carbon tax revenues in the form of a 'citizen dividend'. Figure 5 illustrates the progressive nature of uniform lump sum dividends for a hypothetical UK carbon tax of £40 per tCO_2. The tax affects 47 per cent of expenditures in the poorest 10 per cent of households (income decile 1), but only 33 per cent of household expenditures by the richest 10 per cent (income decile 10). However, the tax raises enough revenue to give each household an equal 'dividend' of £1,000 per year, leaving the lowest five income deciles (i.e. half of all households) better off.

Recommendations for designing a UK carbon tax

There is a case for a stronger carbon price in the UK, which should cover the majority of emissions. A carbon tax could be an effective way of pricing carbon, either alongside the EU ETS, or instead of it if a continued association with the trading scheme is no longer possible after Brexit. To be effective and politically acceptable, such a tax would have to have three important features:

1. High enough level: A UK carbon tax should be at a level that is consistent with the statutory net-zero target. In most sectors, this means a starting point of at least £40 per tCO_2 by 2020 (Burke et al., 2019). The tax should have wide sectoral coverage, and its design should take into account complementary carbon policies (for example, innovation support), existing fiscal measures (for example, taxes on transport fuels) and measures to prevent carbon leakage (for example, border adjustments).

2. Increasing trajectory: The tax level should be increased gradually over time. This offers an efficient way of reducing emissions over time and maximises public acceptability, as people have the opportunity to become familiar with the tax, appreciate its environmental effectiveness and observe the way socioeconomic side-effects are mitigated. There will have to be institutional safeguards and clear rules on how the tax trajectory is adjusted over time. This is to provide long-term clarity and ensure future tax adjustments are taking place.

2. Notes to Figure 5: Household greenhouse gas emissions per decile include both direct emissions (e.g. gas consumption for heating) and indirect emissions (e.g. the emissions embedded in food). Household emissions have fallen since the Gough et al. calculations, and not all indirect emissions may be taxed (e.g. imported emissions may not be). The tax impact and size of the dividend are therefore likely to be less than the figure suggests.

3. Transparent use of revenues: The use of revenues, and the functioning of the scheme, should be communicated clearly and continuously. A debate needs to be had on the balance between recycling tax revenues (by lowering other taxes or in the form of a carbon dividend), earmarking them (for example, for social cushioning or low-carbon investment) and treating them as general tax revenue. Whatever the balance, it is essential for public acceptability that the use of proceeds is carefully explained, for example in an annual report, alongside information on the environmental, social and economic impacts of the tax.

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