Evidence Briefing

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Findings from the first UK survey on CDR policy preferences

‘Who should pay?’

Public Preferences for Carbon Dioxide Removal Policy in the United Kingdom

CO2RE

Carbon Balance Initiative

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The results presented in this briefing are drawn from a larger UK-wide representative survey, carried out between September and October 2024. The funding for this survey was provided by CO_2RE, the UK Greenhouse Gas Removal Hub. CO_2RE is funded by UK Research and Innovation (UKRI).

The views expressed in this evidence brief, including the recommendations, solely represent those of the authors and do not represent those of any associated institutions, including the Smith School of Enterprise and the Environment and Oxford Net Zero at the University of Oxford, CO_2RE, or Imperial College London

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Executive Summary

This brief presents the results from the first national survey on public preferences for carbon dioxide removal (CDR) policy in the United Kingdom. CDR methods remove carbon dioxide (CO_2) from the air, durably storing carbon away from the atmosphere[1]. CDR methods span both conventional methods, such as woodland creation, and novel methods, such as direct air capture with carbon storage (DACCS)[2]. To meet the UK's national net zero target, the UK must scale CDR methods to remove 66 million tonnes of CO_2 annually by 2050 to compensate for emissions elsewhere in the economy[3]. While the Government has supported CDR, crucial questions remain as to how proposed policies will be funded. Based on a nationally representative survey of 2,110 adults, we find broad public support for fossil fuel producers to bear the costs for funding CDR, with the public preferring compliance-based policies over voluntary measures.

Five Key Findings

Nearly half the UK public (48%) believe fossil fuel producers should pay for carbon removal. 48% of survey participants believe fossil fuel producers should be primarily responsible for paying for CDR, nearly three times as many participants who selected fossil fuel users (16%). This suggests a public preference for 'polluter pays' approaches, and in particular for producer responsibility.

There is strong public support for compliance-based policy over voluntary measures. When asked to rank different types of climate policy, 40% of participants ranked direct regulation of companies' greenhouse gas (GHG) emissions as their top choice. For CDR, 43% 'strongly support' legal requirements for fossil fuel companies to remove the carbon they extract (the CO_2 emitted by burning the fossil fuels). Voluntary measures, such as allowing companies to offset their emissions through carbon credits, received the second lowest support of all six policies tested (only strongly supported by 17% of participants).

The passing on of costs to consumers through higher prices has limited impact on policy support. Among participants who believe fossil fuel producers should be held primarily responsible for paying for CDR, a majority (64%) were aware that, if CDR costs are placed on producers, some of these costs may be passed on to consumers through higher product prices. When asked whether this changes their opinion on who should pay, only 17% of these participants state this changes their opinion by a lot, suggesting that pass-through costs may not shift preferences.

Willingness to pay for CDR is limited. Support for funding CDR through income tax is low (15% strongly support), and nearly 40% of participants are unwilling to accept any tax or price increase to pay for CDR. However, approximately one third (32%) of participants are willing to accept an increase of 1-2% in taxes, whilst 38% would be willing to accept a 1-2% increase in prices.

Trust and effectiveness are critical factors for public acceptance. Over half (53%) of survey participants would be willing to contribute more to CDR if they could be confident the money is spent on the right 'things', while 42% would be willing to spend more if they knew CDR was effective at combatting climate change. This suggests that evidence on the efficacy of CDR could strengthen public support.

Policy implications

Current policy proposals may not align with public preferences. Proposed policies for novel CDR, in the near term, rely upon voluntary corporate demand to purchase CDR credits, complemented by government revenue support. Our survey evidence suggests this proposal may lack public support.

Producer-focused compliance policy could help drive finance into CDR while retaining public support. Our results suggest a stated preference for compliance-based policies, such as new legal requirements or taxes on fossil fuel producers. This, in turn, points to policies such as a Carbon Takeback Obligation or similar mandates[4,5]. Such policies could mobilise private capital instead of taxpayer funding to scale CDR[4,5]. All policies, however, must ensure that costs passed through to consumers, in higher taxes or product prices, do not unfairly burden the poorer parts of society.

Maintain public confidence. Building public support for CDR requires the confidence that government is supporting the right methods and that these methods are effective at removing and storing CO_2 away from the atmosphere. This requires clear communication, robust monitoring and verification frameworks, and demonstrated value for money.

The ongoing Independent Review of Greenhouse Gas Removals[6] provides an immediate opportunity to incorporate these findings into policy design.

Introduction

CDR methods* remove carbon dioxide (CO_2) from the air, durably storing the resulting carbon away from the atmosphere[1]. In this brief, for ease of reference, we group CDR methods into two categories**[7]: 'conventional' and 'novel' methods. Conventional methods refer to methods that are well-established and widely deployed, including woodland creation, peatland restoration and soil carbon sequestration[2]. Novel methods, by contrast, are currently deployed at much smaller scales or at earlier stages of research and development. Novel methods include methods such as direct air carbon capture and storage (DACCS), bioenergy with carbon capture and storage (BECCS), and enhanced rock weathering (ERW). In the UK, novel methods are deployed at pilot or field trial scales, but broadly not commercially[8].

To reach net zero by 2050, the UK must both reduce emissions and remove CO_2 from the atmosphere. Modelling by the UK government's advisory body on climate change, the Climate Change Committee (CCC), suggests that, even with ambitious emission reductions, the UK must scale gross removals from conventional and novel methods combined from 20 megatonnes per year ($MtCO_2$/yr) from forestry today to 80 $MtCO_2$/yr from all methods by 2050[3].

Novel CDR methods face particular challenges. Despite the progress of numerous UK start-ups, these methods remain nascent, with deployment hampered by insufficient demand and policy uncertainty.

The government has taken some initial steps to scale up novel CDR methods. Government support for novel methods, namely BECCS and DACCS, has focused largely on stimulating supply, providing £100 million for pilot studies and the development of a 'carbon contract for difference' business model, to provide revenue support to project developers[9]. The government has also consulted on ways to provide longer-term demand for CDR, through integration into the UK Emissions Trading Scheme (UK ETS)[10].

However, current proposals leave the question of 'who pays?' unresolved. Current policy proposals are heavily reliant on voluntary demand from large corporates for removal credits, supported by the government if prices fall below a set reference price[9]. It is yet to be determined how the government's business model will be funded, though costs could be levied on consumer bills such as household energy bills[11]. Integrating CDR into the ETS would mean industrial emitters will pay for the costs of novel CDR, but these costs could be passed on to consumers through higher product prices.

This raises a fundamental question: who will bear the costs of scaling CDR? Any funding mechanism – whether through taxes, regulations, or market mechanisms – will ultimately affect British households and businesses. Without public support, policies risk backlash, reversal, or ineffective implementation. This makes understanding public preferences crucial to designing CDR policy[11].

So far, policymakers have lacked evidence on public preferences for CDR policy. Polling suggests that the UK public broadly supports climate action[12] and the deployment of CDR[13,14], though novel methods, such as BECCS and DACCS, tend to attract less support than conventional methods, such as woodland creation[13-15]. Little evidence exists, however, on the public preferences towards specific policies, who should pay, and how costs may affect their support.

This brief looks to fill that gap. Based on the results of a nationally representative survey of 2,110 UK adults, we provide the first UK-wide analysis of public preferences for CDR policy. Our results are part of a larger survey on CDR carried out and funded by the UK Greenhouse Gas Removal hub (CO_2RE), in September to October 2024.

Our findings suggest public support for compliance-based policies over voluntary measures. Nearly half (48%) of survey participants believe fossil fuel producers should bear primary responsibility for CDR costs. Importantly, this support persists even when respondents understand that costs may be passed to consumers through higher prices. The full methodology and survey questions can be found in the Annex.

* The UK government often uses the term 'greenhouse gas removal', or GGR, to allow for the removal of other greenhouse gases, such as methane. In this brief, we use the term 'carbon dioxide removal', or CDR, which is the most recognised term in global climate policy.

** In this brief, we use conventional and novel categories. The UK government, however, uses the categories 'nature-based GGR methods' and 'engineered GGR technologies' in government communications[7]. Broadly, the two categories are comparable, but where more appropriate, we refer directly to the methods in question.

CDR in Carbon Budget 7

Carbon Budget 7 (CB7) details the Climate Change Committee's most recent modelling of what is needed for the UK to reach net zero greenhouse gas emissions by 2050[3]. Combined, the UK must scale removals from both conventional and novel methods from 20 $MtCO_2$/yr today - largely from forestry - to 80 $MtCO_2$/yr by 2050[3].

This includes removing nearly 30 $MtCO_2$/yr using reforestation methods by 2050, and removing 36 $MtCO_2$/yr from novel methods, mainly through deploying BECCS (25 $MtCO_2$/yr)[3] (**Figure 1**). Given these scales, and the fact that novel methods are hardly deployed today, novel CDR methods need to scale fast if the UK is to meet its net zero target by 2050. Realising this will prove challenging for both conventional and novel methods. However, this brief focuses on novel methods, owing to their nascency. The scales reached for novel CDR are unlikely to be met using voluntary or private markets alone, making the question of 'who pays?' crucial to delivery.

Since the publication of CB7, the UK government has launched an independent review, further advising on the scale and role of novel CDR methods in decarbonisation[6].

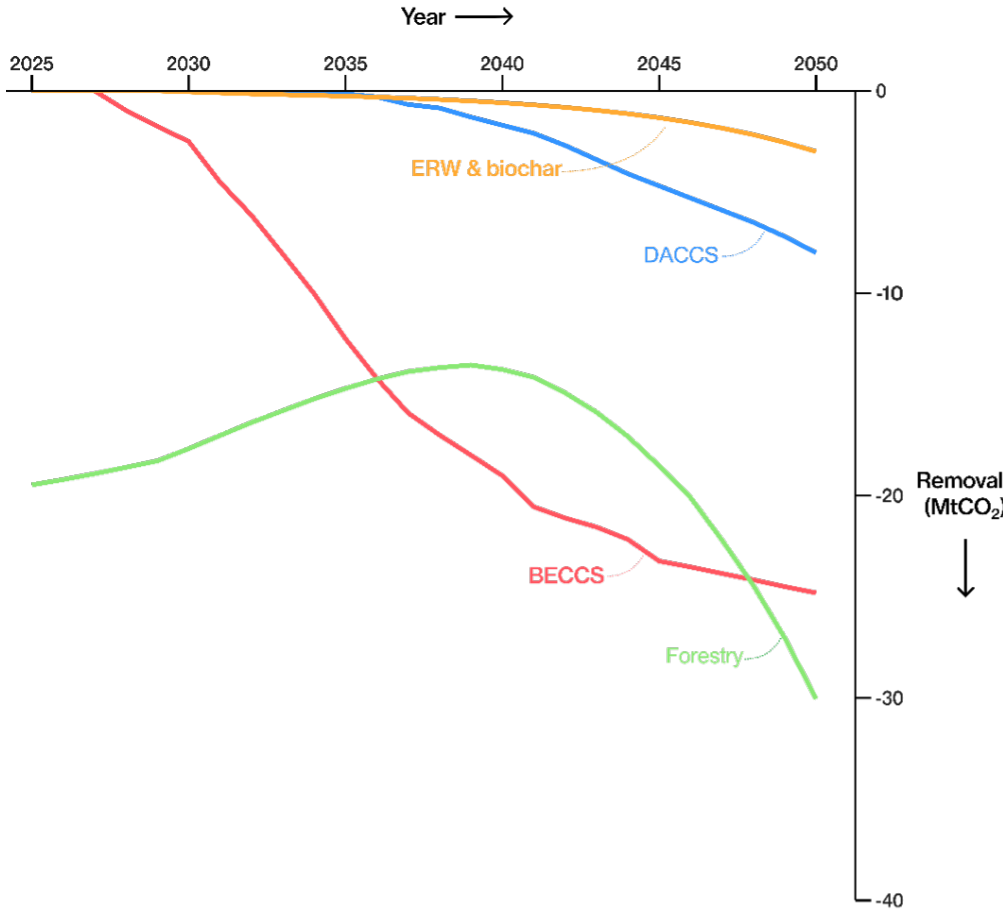


Figure 1 - Which CDR methods are in CB7?

ERW refers for enhanced rock weathering, which is combined with biochar in the CB7 dataset. Source: CCC, Carbon Budget 7 (CB7) dataset.

Results

1. Regulation ranks highest among climate policy options

When asked to rank different climate policies, regulations on companies to manage the emissions they produce has the strongest public support, with 40% of all survey participants ranking regulation as their first choice, and 21% ranking regulation as their second choice (**Figure 2**).

By comparison, the option of using voluntary markets, which allow companies to offset their emissions through carbon credits, including removal credits, receives little support. This ranks on average lower than direct regulation, subsidies, and compliance markets, such as the UK Emissions Trading Scheme (ETS).

This ranking suggests a preference towards compliance-based policy, such as mandates, product standards, or regulation or the UK ETS, perhaps combined with the use of subsidies where appropriate.

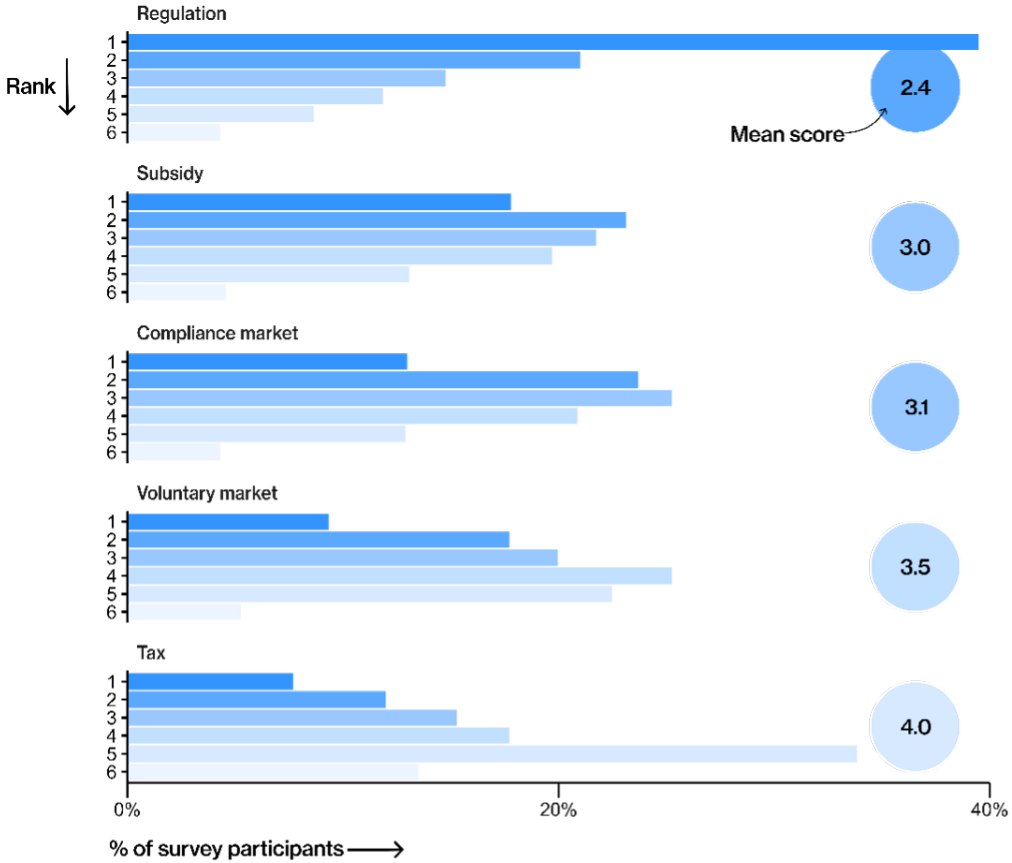


Figure 2 – Which climate policies are most preferred?

Participants were asked to rank policies according to preference, and were explained how each policy worked. The exact wording can be found in the Annex. Tax refers to income tax. Mean score follows the ranking, meaning the lower the score the 'more preferred' the policy. Not shown is 'none', reflecting an option within the survey to select 'none of the above'.

Results

2. Low public support for taxes and voluntary markets

When participants were asked about their support for policies to incentivise CDR, support was highest for policies that place a tax on producers or large users of fossil fuels, or otherwise set out a legal framework requiring fossil fuel companies to remove the carbon they produce (44%, 39% and 43% of survey respondents 'strongly support' these policies respectively, see **Figure 3**). This suggest a high level of public support for 'polluter pays'

Similarly to **Figure 2**, lower support was observed for voluntary markets such as those that allow for the purchase of carbon credits (17% of survey respondents 'strongly support' the policy). Supporting CDR through income tax received the lowest public support, with only 15% strongly supporting the policy. Yet, it is noted that even income tax received nearly 50% overall support ('strongly support' and 'slightly support' combined).

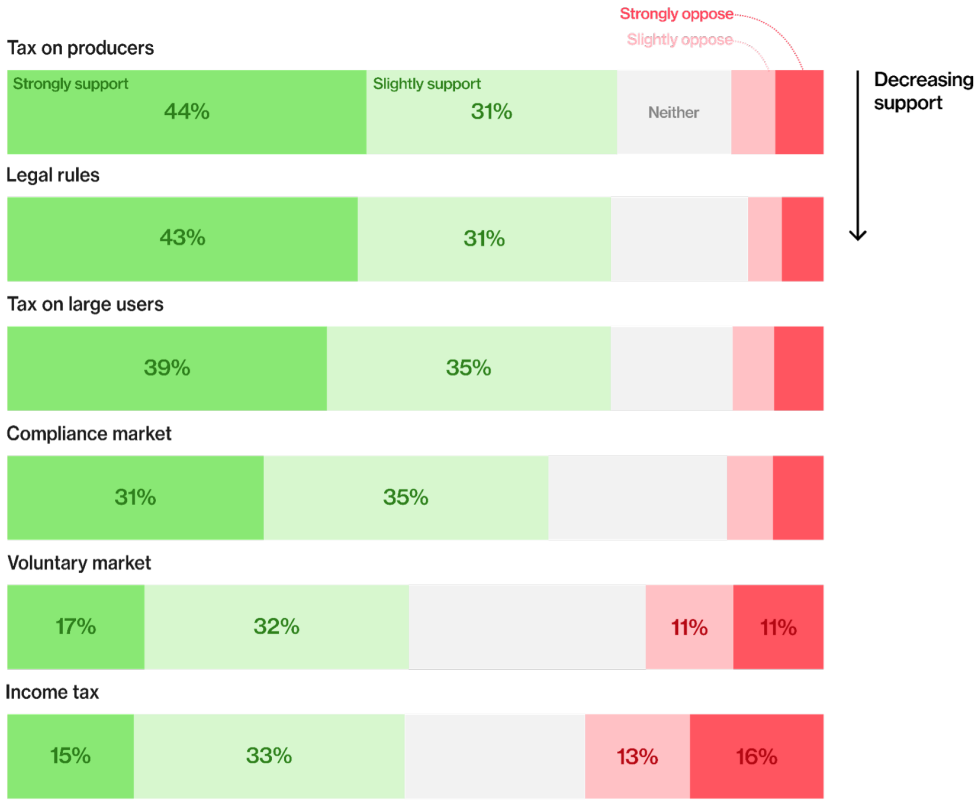


Figure 3 - Which CDR policies are most preferred?

Participants were asked to what extent they support or oppose different policies to pay for CDR. The exact wording can be found in the Annex.

Results

3. Clear public support for fossil fuel producers to be held responsible

When asked who should be primarily responsible for paying for CDR, nearly half (48%) of the survey participants believe fossil fuel producers, such as oil and gas companies, should bear primary responsibility. This compares to 16% who believe companies that use fossil fuels should pay.

The preference for producer responsibility as opposed to user responsibility demonstrates support for the polluter pays principle, and more specifically for 'extended producer responsibility' (EPR), which holds producers of products responsible for the end-of-life waste of a product (see **Box 1**)[5]. Policies to enforce EPR could include stronger mandatory frameworks such as a Carbon Takeback Obligation, carbon removal mandates, or sub-mandates within the ETS.

This preference for producer responsibility is notable given that the government's current proposal to integrate CDR into the ETS largely focuses on the companies that use fossil fuels rather than those that produce them. 24% of participants thought government should be responsible for CDR, though this must be viewed alongside other results indicating low support for tax funding to pay for CDR.

Producer v. User Responsibility

Producer responsibility means fossil fuel extractors and sellers (e.g. oil and gas companies) are held responsible for investing in, deploying, or paying for carbon removal.

User responsibility places this obligation on those who buy and use fossil fuels (e.g. manufacturers).

While both approaches can lead to higher consumer prices, producer responsibility spreads costs across the entire value chain, including upstream actors. This reflects the principle of Extended Producer Responsibility (EPR), commonly applied in sectors like plastics and electronics, where producers are accountable for the environmental impact of their products throughout their lifecycle, including the post-consumer stages.

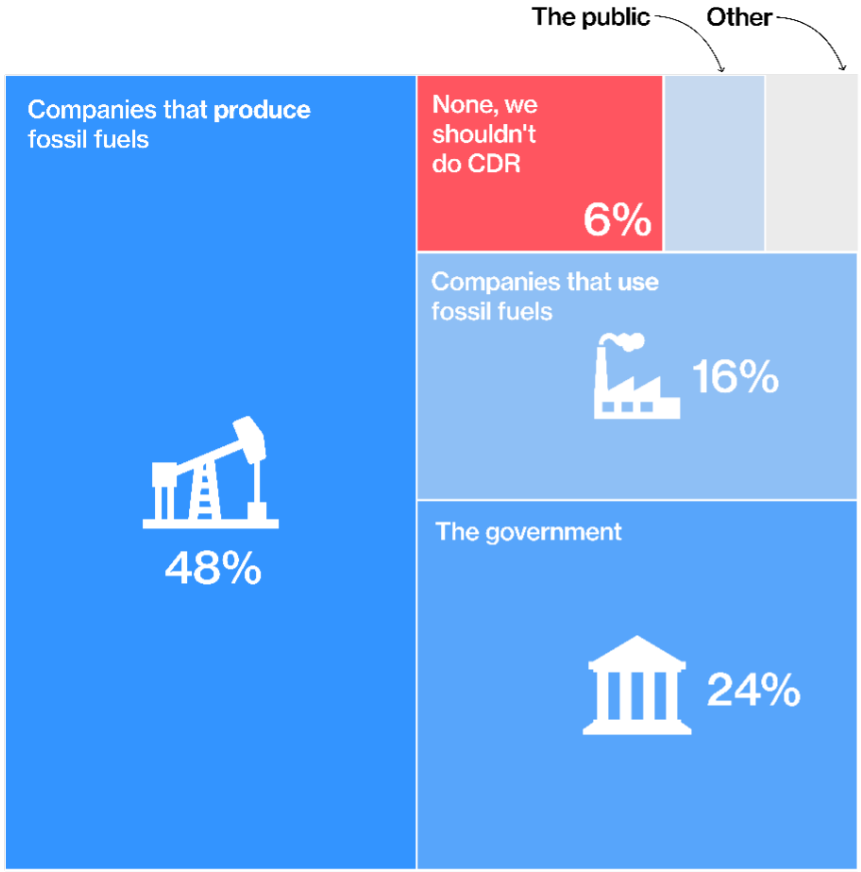


Figure 4 - Who should be primarily responsible for paying for CDR?

Participants were asked who should be most responsible for paying for CDR in the UK and selected among six pre-defined options and an open 'other' option. This question was designed to force prioritisation and assumes real-world trade-offs between policy options. Exact wording can be found in the Annex.

Results

4. Pass-through costs are not a deal breaker for producer responsibility, but they do affect support

Once participants had selected policy preferences, they were asked about their awareness of pass-through costs to reflect the possibility of higher taxes and higher prices as a result of funding CDR. The majority (62%) said they were already aware that a proportion of these costs would be passed on to consumers (**Figure 5**). Among those who believe fossil fuel producers should be primarily responsible for paying for CDR (56%), awareness was even higher, at 64%.

Among those who believe fossil fuel producers should be primarily responsible for paying for CDR, but were unaware of pass-through costs, more than a quarter (29%) stated that these costs do not change their opinion. Only 17% said this information substantially changed their opinion. However, the majority (55%) said that information about pass-through costs changed their opinion 'a little'. This suggests that while support for producer responsibility for CDR is likely to remain stable, it may be somewhat moderated based on additional costs and the degree to which costs are passed through to consumers. It also highlights the importance of transparency for retaining public support.

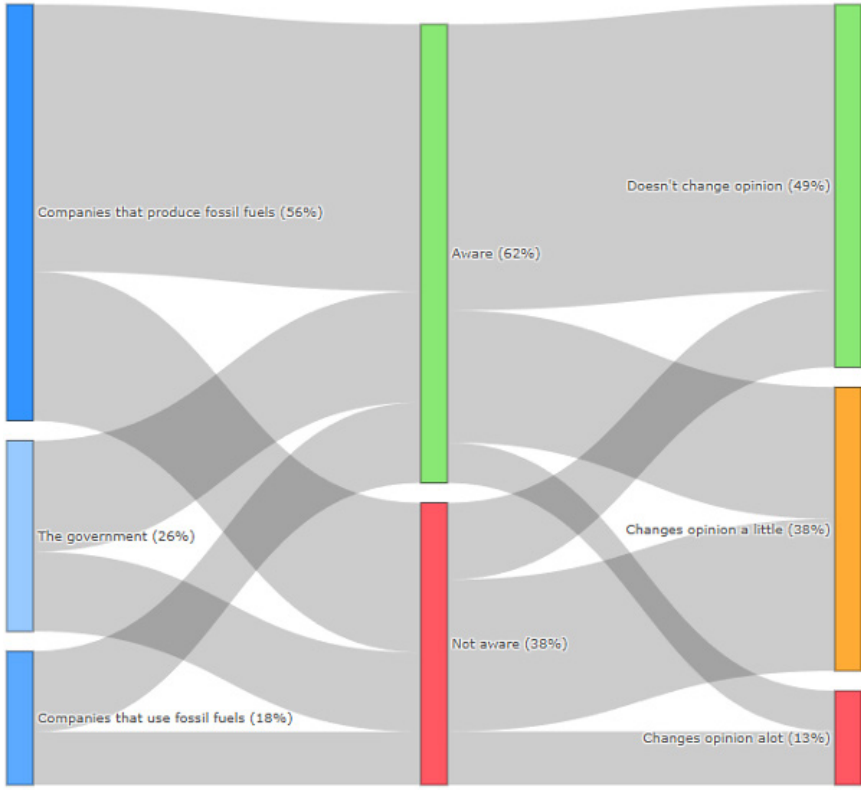


Figure 5 – Does knowing about pass-through costs change opinions?

After selecting who should be most responsible for paying for CDR, participants were asked about their awareness of pass-through costs and whether this information changes their opinion. Exact wording can be found in the Annex.

Results

5. One third of participants would pay more to fund CDR

When asked about the willingness to contribute financially to CDR through higher taxes or higher product prices, the largest proportion of participants said they were not willing to pay more to support CDR (38% for additional taxes, 40% for higher prices). Nearly a quarter (24%) of participants said they simply "did not have the money" to consider spending more on CDR.

However, a substantial minority of the UK public – at least 1/3rd – said that they would accept paying 1-2% more in tax (32%) or higher prices (38%) to pay for CDR. This aligns with findings from past surveys on support for climate action[16].

When asked about specific monetary amounts, 30% of respondents said they would pay no amount (£0) for CDR. However, 30% of participants indicated they would be willing to pay between £1-25 annually, with a small subset of respondents (8%) willing to pay over £100 a year to support CDR. If extended across the UK working-age population, this could theoretically generate up to £1.4 billion, though studies comparing stated and revealed willingness to pay suggest much lower sums in practice[17].

While previous results suggest there is public support to pay for CDR, these results suggest that, when translated into direct financial contributions, willingness to pay may be more limited.

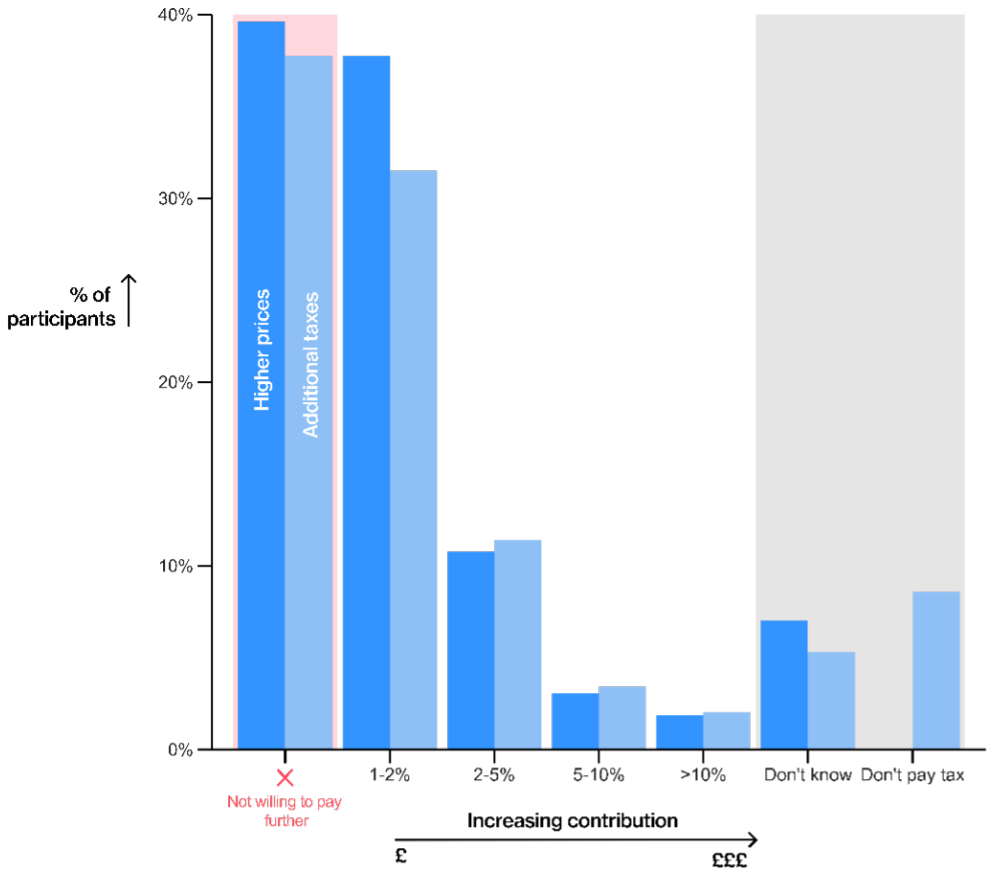


Figure 6 - How much are people willing to pay for carbon removal, either through higher prices or taxes?

Participants were asked if they were willing to contribute financially to CDR and asked to tick all that apply, as well as an open 'other' option. Exact wording can be found in the Annex.

Results

6. Trust and effectiveness are key to public support

When asked what might boost their willingness to pay for CDR, 53% of survey participants said trust was key to their support, by ensuring that public money is being spent on the correct priorities (**Figure 7**). 42% of participants suggest that proof of CDR's effectiveness in addressing emissions would further their support, suggesting a slight scepticism of CDR.

Only 7% of all respondents suggested that the UK should not be pursuing CDR ('No CDR' option in **Figure 7**), suggesting broad support for CDR, as similarly reflected in **Figure 4**.

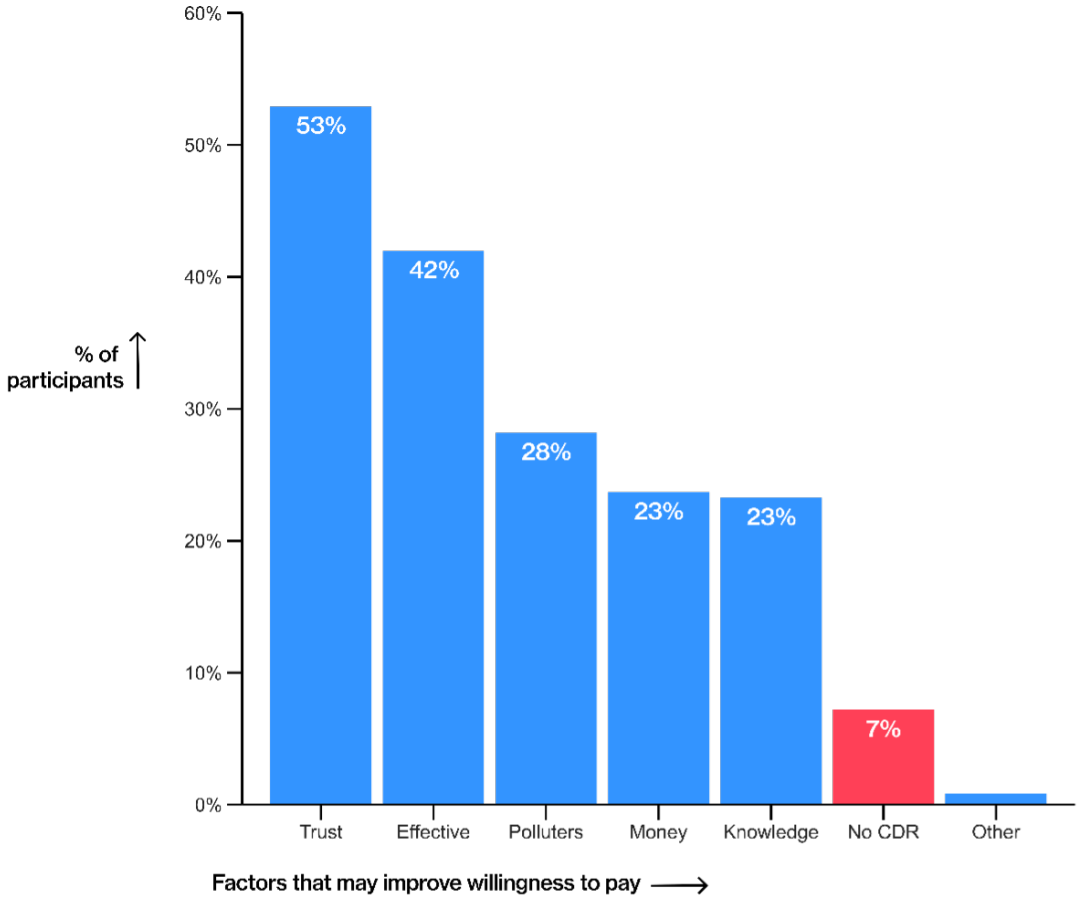


Figure 7- What would make people more willing to pay for CDR?

Participants were asked whether anything would make them more willing to pay for CDR, and selected among six pre-defined options and an open 'other' option. Full wording is available in the Annex.

Policy takeaways for CDR

The results of the survey have clear implications for how the UK's policy towards CDR could be improved, namely:

Focus on compliance-based policies and extended producer responsibility

The UK government should prioritise compliance-based policies over voluntary markets.

The government's current approach relies on demand from large corporates to purchase removal credits on the voluntary carbon market, prior to integration into the UK ETS, which is a compliance market[9,10]. Our survey results suggest public support for stronger intervention, particularly on holding the producers of fossil fuels responsible for the cost of CDR. The government's current Independent Review on GGR6 should therefore explore introducing near-term compliance-based policy, such as a mandate to fund CDR, levied on fossil fuels producers or other sectors. This has been explored in studies previously commissioned by the government[18,19]. Compliance-based policy should build on the strong public support for producer responsibility (**Figure 4**), legal rules on companies to fund CDR, and taxes on producers and users (**Figure 3**).

Consider pass-through costs in policy design

Using income tax to pay for CDR is unpopular compared to other policies (**Figure 3**), and public willingness to pay for CDR is limited (**Figure 6**), with nearly 40% unwilling to contribute any further amount to fund CDR.

The results show direct regulation of companies with transparent pass-through costs could help maintain public support.

However, the scale and distribution of these costs depend on policy design[11]. Understanding the proportion of costs passed on and how these costs are distributed, therefore, is important to further policy development. Efforts should be made to minimise pass-through costs and ensure that, when a proportion of costs are passed to consumers, the burden posed is progressive rather than regressive, requiring less of low earners as a proportion of their income[11].

Focus on building public trust by demonstrating effectiveness

Our survey suggests public support can be built by demonstrating value for public money and assuring the effectiveness of CDR. The UK government has taken steps to ensure value for money, by, for example, developing a standard for the monitoring, reporting and verification of removals, ensuring that CDR projects demonstrate a climate benefit before receiving public money[9].

However, more efforts can be made to demonstrate effectiveness, for example, by publicly publishing the result of pilot projects from the government's innovation funding[20]. Effectiveness could also be demonstrated by publishing further independent reports on the effectiveness of CDR methods, as was carried out for BECCS during the publication of the 2023 Biomass Strategy[21]. Public trust considerations should also be integrated into future policy development on the GGR business models and GGR integration into the ETS.

As the first UK survey on public preferences for CDR policy – and the first to distinguish between fossil fuel producers and users – these findings provide policymakers with unique evidence on public attitudes for financing CDR. This has important implications for the government's current Independent Review on GGR, and findings should be incorporated to ensure the CDR policy in the UK continues to progress with the right public support.

Annex 1 - Methodology

This Annex further details the survey design, alongside the wording of the questions asked of participants.

Survey design

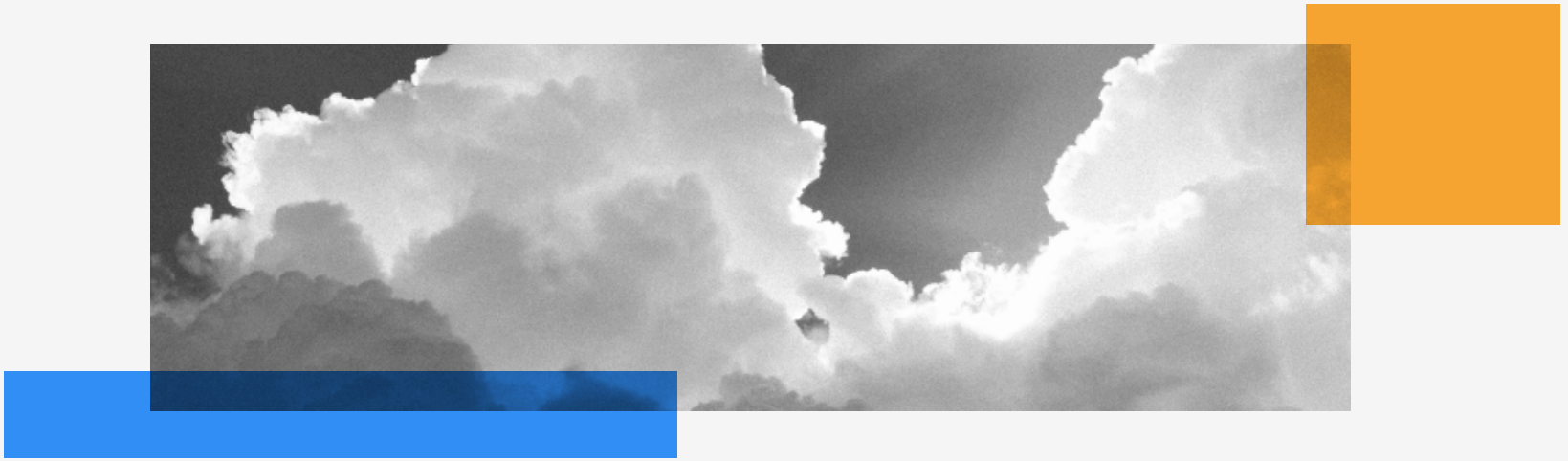
The survey was initially piloted using face-to-face cognitive interviewing[22] (n=10) and two online pilots (n=200). It was distributed online by Qualtrics in September-October 2024 using their panel samples. We used quotas to obtain a nationally representative UK sample according to age, gender, ethnicity, and region. All participants gave their informed consent, and ethics approval was granted by the Oxford Central University Research Ethics Committee (CUREC). After data cleaning for duplicates, invalid IP addresses, bot detection, speeding, and failed attention checks, the total sample was n=2027.

The survey started with some general demographic information and questions about climate change, followed by a brief description of CDR and questions about their awareness, support, feeling, and specific emotions toward carbon removal and 10 specific CDR methods. The data from this part of the survey is publicly available at Cox et al., 2024, citation[23].

The questions reported in this paper appeared in the second part of the survey. First, participants were asked about their climate policy preferences (ranking task with 6 pre-defined options plus 'none of the above') and CDR policy preferences (matrix question with 6 pre-defined policy options, 5-point Likert for each plus 'don't know'). Next, a question asking who should be most responsible for paying for CDR in the UK. Those who answered that 'the government' should be most responsible were directed to a follow-up question asking if they were aware that this cost would probably be passed on to citizens via their taxes or energy bills (yes/no), then a question asking whether this changed their opinion on the question "a lot", "a little", or "doesn't change my opinion", plus "not sure". Participants were reminded of their responses to the previous questions.

The same approach was taken for those answering that 'companies' should be most responsible; these participants were told that 'this cost would probably be passed on to consumers via higher prices for the company's products'. Participants who answered that 'the public', 'none' or 'other' should be most responsible (11.5% of the total sample) were not asked these follow-up questions. Next, all participants were asked three questions about how much extra they would be willing to pay to support carbon removal, in % on taxes, % on prices, and in £ total per year. Finally, they were asked what, if anything, would make them more willing to pay for CDR.

The survey ended with some questions about people's worldviews[24] and their political affiliation. All analysis was conducted in Excel and SPSS.



Survey questions

Figure 2: Responses to the question: “Different policies for net zero have been proposed. Please put the following policies in order of preference, with 1 being your most preferred and 6 being your least preferred”. Options: (1) Taxes: an increase in general tax (e.g. income tax) to raise money for technologies to tackle climate change (2) Subsidies: the government give direct payments or tax breaks for technologies to tackle climate change (3) Regulation: the government puts rules on companies to manage their carbon (4) Carbon markets: companies have to offset their carbon via a market which is run by the government (5) Voluntary carbon markets: companies can choose to offset their carbon via a private sector market (6) None of the above.

Figure 3: Responses to the question “To what extent do you support or oppose the following?” (Matrix question, ‘strongly support’ to ‘strongly oppose’). CDR policy preference options (1) Using money from income tax to pay for new Carbon Removal technologies; (2) A tax on companies that produce fossil fuels (e.g. oil companies), which would be used to pay for Carbon Removal technologies; (3) A tax on industries that use fossil fuels (e.g. manufacturing) which would be used to pay for Carbon Removal technologies; (4) Legal rules which require fossil fuel companies to remove the carbon they produce; (5) Making companies offset their emissions via government-regulated markets such as the UK Emissions Trading Scheme; (6) Allowing companies to choose to offset their emissions via self-regulated Voluntary Carbon Markets. All bold text appeared in rich formatting in the survey itself. All participants were asked about all 6 policy options sequentially in a 5-point scale matrix question.

Figure 4: Responses to the question “Who should be most responsible for paying for Carbon Removal in the UK?”. Pre-defined options: (1) The government; (2) Companies that produce fossil fuels (e.g. oil companies); (3) Companies that use fossil fuels (e.g. manufacturing); (4) The general public, via income tax; (5) None - we should not do any Carbon Removal; (6) Other: write in. Bold text appeared in rich formatting in the survey itself. Participants were only allowed to choose one option; therefore, the graph represents only the categories with the strongest feeling, and choices will not be mutually exclusive.

Figure 5: After selecting the responsible answer in the previous questions, participants were asked (1) if they were aware costs will be passed through to consumers/taxpayers (with options “aware” or “not aware”) and (2) if this information changes their opinion on whether that actor should be most responsible, with three options (i) “doesn’t change my opinion” (ii) “changes my opinion a little” (iii) “changes my opinion a lot”. It shows the proportion of the sample who are aware of the fact that costs will be passed through to consumers/taxpayers, and the proportion for whom this information changes their opinion on whether that actor should be most responsible. Note the difference in question wording between “changes opinion a lot” (full opposition) versus “changes opinion a little” (ambivalence).

Figure 6: Participants asked two separate questions - one asking how much % they would be willing to pay in “higher taxes” to support carbon removal; another asking how much % they would be willing to pay in “higher prices for certain everyday items”. All participants received both questions. The response options were the same for both questions, apart from ‘I don’t currently pay tax’. Note that these questions appeared in the survey after a large number of questions about Carbon Removal and individual technologies (not reported here), and who has responsibility to pay, where they learnt about cost pass-through from government and companies.

Figure 7: Participants were asked “Would anything make you more willing to pay for Carbon Removal technologies? Tick all that apply”. Predefined options were (1) If I knew that Carbon Removal would be effective at addressing climate change; (2) If I could trust that the money was being spent on the correct things; (3) If the money is not given to polluting companies; (4) If I knew more about the technologies involved; (5) Nothing - I don’t have enough money as it is; (6) Nothing - I don’t think we should be removing carbon. (7) Other: write in. Since participants were allowed to select multiple options, results are displayed in terms of number of participants (left-hand axis) and percentage of participants (right-hand axis).

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