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THE COST-EFFECTIVENESS OF DONATING TO CLIMATE CHANGE ACTIVISM

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Table of Contents

This work is preliminary, and subject to change. Questions and comments are welcome at givinggreen@idinsight.org. ***Last updated November 12, 2021.*** *Cover image: Mark Dixon.*

Overview

Climate change activism focused on US federal policy can potentially reduce levels of greenhouse gases (GHGs) in the atmosphere by impacting the likelihood of climate bills passing in the House and Senate, or by affecting executive or regulatory policy. We developed a simple cost-effectiveness analysis (CEA) model that assesses activism's contribution to GHG emissions. In this model, we focused on activism's potential impact on two types of bills: a bipartisan bill and a progressive-influenced bill passed along party lines. After testing various scenarios in our CEA (e.g., Very Pessimistic to Optimistic), we found that donating to climate change activist groups could be highly cost-effective in reducing GHGs, which we measured in terms of CO2-equivalent (CO2e). Namely, our Realistic case estimated that activism could remove CO2e at a cost of $0.15 per metric ton. In other words, a dollar spent on activism could remove more than 6 metric tons of CO2e. In general, the cost per change in metric ton of CO2e ranged from $0.07 to remove a ton of CO2e to actually adding a ton of CO2e for every $1.04 spent on activism. We explore these pathways for negative effects in detail, and conclude that they are highly unlikely.

Our Realistic scenario's estimate of $0.15 per metric ton of CO2e compares favorably against top-performing insider policy advocacy organizations such as Evergreen Collaborative and Carbon180, which are predicted to remove CO2 from the atmosphere at a cost of $0.54 and $0.66 per metric ton (in expectation), respectively. (Please see our deep dive reports on Evergreen Collaborative and Carbon180 for further information.) This suggests that activism could be nearly as effective as a best-in-class insider policy advocacy organization in reducing CO2e. However, donating to activism runs the very small risk of either having a negative effect or no effect at all on CO2e levels. For this risk to occur, (1) bipartisan climate bills would need to be highly impactful and (2) activism would also need to reduce the likelihood of bipartisan bills being passed. We believe that the former is somewhat unlikely and that the latter is unlikely, making the overall risk low.

We conducted our CEA by (1) estimating how much CO2e could be averted through bipartisan and progressive climate bills between 2022 and 2030, (2) assuming the change in probability of these climate bills being passed due to activism, (3) calculating an expected value for activism in terms of CO2e averted, and (4) using our estimates and assumptions to calculate cost-effectiveness. Given the large uncertainty on the different values we used in our analysis, our estimates should be viewed as rough, indicative estimates.

Methods

High-level overview of our modeling strategy

To determine the cost-effectiveness of activism in removing CO2e from the atmosphere, we developed a stylized situation that includes two types of bills: a modest bipartisan bill and an ambitious progressive-led bill. The key dynamics from our model comes from the assumption that progressive activism will have a positive impact on the progressive bill passing, but an ambiguous impact on the bipartisan bill passing. We also assume that there are more opportunities for a bipartisan bill to pass than a progressive one.

We estimated activism's cost-effectiveness by taking the steps detailed in Figure 1 and described below.

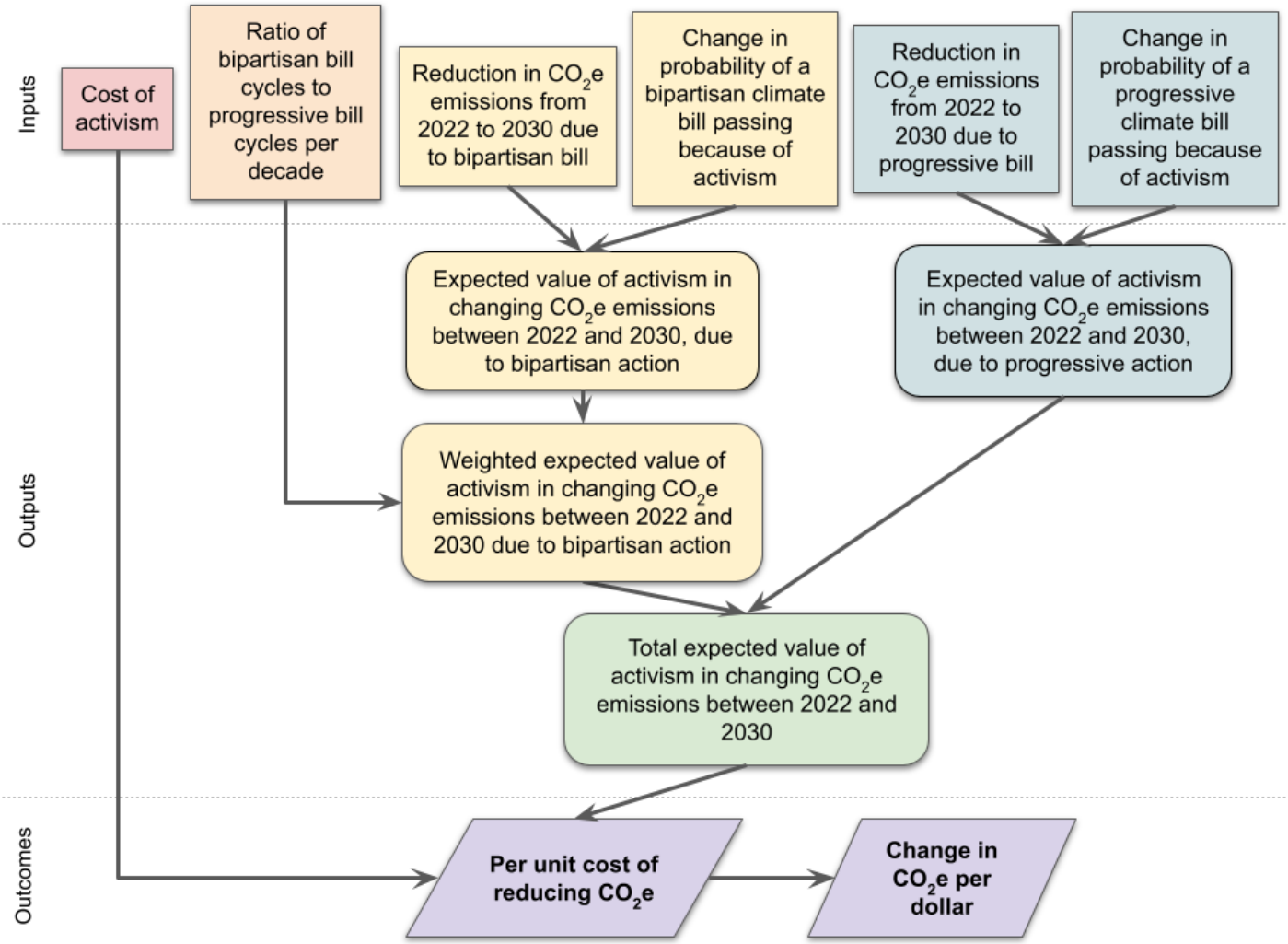

Figure 1: Flow chart describing the process of estimating activism's cost-effectiveness. Rectangles indicate model inputs while rounded rectangles represent outputs. Parallelograms indicate the final model outcomes. Values related to the bipartisan bill are yellow while values related to the progressive bill are blue.

Inputs

Our model included four different types of inputs:

1. The progressive and bipartisan bills' reductions in CO2e emissions from 2022 to 2030,
2. The effect of activism on the likelihood of either bill passing,
3. The ratio of bipartisan bill cycles to progressive bill cycles per decade, and
4. The cost of activism.

Reduction in CO_2e emissions from 2022 to 2030

We used the Infrastructure Investment and Jobs Act (also known as the bipartisan infrastructure bill) and the current [November 2021] Build Back Better Act proposal as examples of bipartisan and progressive bills, respectively. The infrastructure bill is the major federal infrastructure spending of 2021 while the Build Back Better Act is a Democrat-supported spending bill that is being passed through budget reconciliation. We considered the infrastructure bill to be bipartisan because it passed with bipartisan support in both the House and Senate. Compared to the infrastructure bill, the Build Back Better Act is expected to be more

progressive and contain more ambitious pro-climate policies because it only needs a simple majority to pass in a Democrat-controlled Senate.

We used existing models for the bills' climate provisions to estimate their CO2e reductions from 2022 to 2030 compared to business-as-usual (BAU). We focused on this time period because we assumed that progressive legislation would only occur under a Democratic trifecta, which has occurred about once every decade for the past forty years. In other words, if a progressive bill does not pass now, it will not have a chance to pass until Democrats control both the White House and Congress, estimated to be around 10 years from now. (We project climate impacts for 8 years as a conservative estimate.)

The effect of activism on the likelihood of either bill passing

The effect of activism on the likelihood of either bill passing was the most difficult parameter of our model to estimate and is highly subjective. To estimate this, we first assumed that climate change activism would be progressive. We then assumed that activism would increase the likelihood of a progressive bill being passed because of their similar alignment, and that this is the explicit policy goal of many progressive activist organizations. For a bipartisan bill, we allowed activism to have positive or negative effects of passing. For example, activism could have a positive effect if progressive pressure moves the position of the center or spurs action by the right to stave off more progressive legislation later. Conversely, it could have a negative effect if activism polarizes climate change as an issue such that it cannot get right-wing support or if it prevents compromise. Additionally, activists may advocate for a more progressive bill in place of the bipartisan bill; this could therefore reduce the bipartisan bill's likelihood of being passed. To account for uncertainty in our estimates, we examined a range of probabilities, which we labeled as our Very Pessimistic, Pessimistic, Realistic, and Optimistic scenarios.

Ratio of bipartisan bill cycles to progressive bill cycles per decade

Because bipartisan bills are likely up for consideration more often than progressive bills, we needed to weight activism's expected value by this difference in frequency. We therefore assume that there will be multiple bipartisan bill opportunities for every opportunity for a progressive bill.

Cost of activism

We used the Sunrise Movement's finances from 2015 to 2020 as a proxy for the cost of climate change activism. We used the Sunrise Movement because it is one of the most successful climate change activist groups. Although our model uses the Sunrise Movement's finances, it is not explicitly intended to be an analysis of the Sunrise Movement's cost-effectiveness (though we have adopted a version of this model to estimate Sunrise's impacts).

Expected values

We computed the expected value for the two bills by multiplying each of their probabilities by their CO2e reduction. We weighted activism's expected value for the bipartisan bill by multiplying its unweighted expected value by the ratio of bipartisan bill cycles to progressive bill cycles per decade. We summed the bills' expected values to compute activism's total expected value.

Outputs

We found the per unit cost of changing CO2e by dividing the cost of activism by its expected value. The change in CO2e per dollar was the reciprocal of the per unit cost.

Detailed overview for estimating activism's cost-effectiveness

Details on how we estimated activism's cost-effectiveness are as follows:

Inputs

Reduction in CO_2e emissions from 2022 to 2030

We estimated each bill's CO2e reduction by either using models produced by research groups or by conducting back-of-the-envelope calculations with publicly available data. We compared each bill's CO2e reduction against its respective BAU case. Exact details on our methods and assumptions can be found in our CEA model.

Bipartisan climate bill

We used climate provisions from the Infrastructure Investment and Jobs Act as a proxy to estimate how much CO2e could be averted due to a bipartisan climate bill. For our CEA, we included the following climate provisions from the infrastructure bill:

- Electrifying transit and school buses,
- Expanding the US network of electric vehicle (EV) chargers,
- Capping abandoned gas/oil wells to prevent methane leaks,
- Reducing emissions near ports and airports, and
- Extension of 45Q tax credit (from the previous Energy Act which was passed via the Consolidated Appropriations Act in 2021).

We excluded some of the infrastructure bill's climate provisions from our analysis. For example, we could not find enough publicly available information on the bill's funding for battery research and development (R&D). The degree to which battery R&D would reduce CO2e emissions was also unclear. By excluding these climate provisions, we may have underestimated how much the bipartisan bill actually reduced CO2e emissions.

Additionally, the current bipartisan bill includes funding for R&D for carbon capture. As it is very difficult to estimate the impacts of R&D, we instead included a similar measure from a previous bipartisan bill, which extended the 45Q tax credit for carbon capture; CO2e reductions due to the 45Q tax credit were more straightforward to estimate than the provisions in the current bill.

Progressive climate bill

To estimate how much a progressive climate bill could reduce CO2e emissions, we used the Build Back Better Act as a proxy. Policy proposals that we included in our proxy progressive bill included:

- Programs that would incentivize a transition to 80% clean energy in the power sector by 2030,
- Electrifying homes through a heat pump rebate program, and
- Providing EV tax incentives.

As with our infrastructure bill analysis, we did not include all of the Build Back Better Act's proposed climate policies. For example, we excluded proposals related to land conservation because they were too complex to model and because their inclusion in the Build Back Better Act was uncertain. We assumed that excluding these proposals was reasonable because based on media coverage of the Build Back Better Act, clean electrification appeared to be its most important climate provision by a wide margin. It therefore seemed

likely to us that policy proposals that would lead to 80% clean energy by 2030 would dominate the total amount of CO2e reduced and that the other proposals would be less important to our calculations.

The effect of activism on the likelihood of either bill passing

Bipartisan climate bill

For our Realistic and Optimistic scenarios, we assumed that activism would increase the likelihood of a bipartisan bill being passed. For the Very Pessimistic and Pessimistic cases, we assumed that activism would either decrease this same probability or have no effect at all. Ultimately, we estimated probabilities of -5%, 0%, 1%, and 5% for the Very Pessimistic, Pessimistic, Realistic, and Optimistic cases, respectively. We selected these values by first assuming that the Realistic case would increase the probability of the bipartisan bill being passed by a very small percentage. We then used that percentage to anchor our estimates for the remaining cases.

Although we examined a case in which activism would have a negative impact on bipartisan action, we believe that the likelihood of the Very Pessimistic case actually happening is very low. For example, activist pushback against modest climate reforms may be viewed negatively but can in fact have a positive effect on climate. For instance, the activist-led "No Climate, No Deal" campaign in 2021 led to sixteen US Senators refusing to vote on the infrastructure bill unless it included bold climate action. Ultimately, the bill was passed in the Senate with the inclusion of various climate provisions. This kind of brinksmanship likely results in bipartisan bills having stronger climate provisions, but also increases the chance that no bill passes at all. However, we are not aware of any cases where progressive pressure has actually derailed a bipartisan climate bill from passing.

Progressive climate bill

We assumed that activism would increase the likelihood of a progressive bill passing. We assigned probabilities of 0.5%, 0.5%, 5%, and 10% for the Very Pessimistic, Pessimistic, Realistic, and Optimistic cases, respectively. These values were informed by our research and expert interviews. While impossible to know for sure, most insiders have told us that the climate provisions in the Build Back Better Act would not have happened without the rise in activist policy organizations (such as the Sunrise Movement) over the last couple of years.

Time-dependency of bills being passed

The probability of either a bipartisan or progressive bill being passed (and therefore the influence of outside organizations) is highly time-dependent because it strongly depends on the political climate. Namely, the likelihood of a climate bill being passed is probably reduced during years in which either the House, Senate, and/or Presidency are under Republican control. We selected our probabilities based on the current political climate.

Ratio of bipartisan bill cycles to progressive bill cycles per decade

For both the Very Pessimistic and Pessimistic cases, we assumed that bipartisan bills with climate provisions would be proposed once every Congressional cycle (once every two years) while progressive bills would be proposed once every time Democrats control the House, Senate, and White House (roughly once every decade). For the Realistic case, we assumed that bipartisan bills would be proposed every presidential term (once every four years) instead of once every congressional cycle. As for the Optimistic case, we assumed that bipartisan bills would occur twice as frequently as progressive bills.

Cost of activism using the Sunrise Movement's finances

We used the Sunrise Movement's revenue from 2015 to 2020 as a proxy for activism's estimated cost. We selected the Sunrise Movement as an archetype because it is one of the most successful climate change activist groups in recent years. We chose this time period because it covered the beginning of the Sunrise Movement's finances through the end of 2020, which is roughly when Democrats secured the House, Senate, and White House and therefore increased the likelihood of substantive climate policy being passed. Activist groups, such as the Sunrise Movement, likely used their funding raised up until that point to advocate for passing pro-climate policies under the Democratic trifecta. We calculated the Sunrise Movement's total revenue from 2015 to 2019 using publicly available tax returns. We estimated its 2020 revenue using its self-reported budget for that year.

Expected values

We computed activism's unweighted expected value by multiplying the changes in probabilities for the two climate bills by their estimated reductions in CO2e relative to BAU. We weighted activism's expected value for the bipartisan bill by multiplying it by the ratio of bipartisan bill cycles to progressive bill cycles per decade. We found activism's total expected value by summing the two bills' expected values.

Outputs

To determine activism's cost-effectiveness in reducing CO2e emissions, we divided activism's total expected value by its estimated cost. We computed the cost-effectiveness both in our CEA model and in an additional Guesstimate spreadsheet, which allowed us to assign ranges of values and probability distributions for each input. The Guesstimate model uses Monte Carlo simulations with 5,000 samples per metric. This simulation enabled us to account for uncertainty in each parameter by predicting many thousands of potential futures. Information on how we set this model's bounds can be found in the Guesstimate spreadsheet.

Results

Reductions in CO_2e

Relative to BAU, the climate provisions in the bipartisan bill are predicted to reduce CO2e emissions by about 160 million metric tons between 2022 and 2030. In comparison, the progressive bill is predicted to reduce CO2e emissions by about 3,200 million metric tons over the same time period. The provision for incentivizing 80% clean energy by 2030 alone is expected to contribute to 92% of the progressive bill's emissions reduction between 2022 and 2030.

Cost-effectiveness of activism on climate change

According to our CEA model, the cost of changing CO2e emissions is expected to be -$1.04, $1.53, $0.15, and $0.07 per metric ton for the Very Pessimistic, Pessimistic, Realistic, and Optimistic cases, respectively (Table 1). This is equal to a change in CO2e of -0.96, 0.65, 6.70, and 13.72 metric tons of CO2e per dollar for the Very Pessimistic, Pessimistic, Realistic, and Optimistic cases, respectively. The Very Pessimistic case's negative signs indicate that CO2e emissions will increase under this scenario.

Table 1: Cost-effectiveness of activism on removing CO2e from the atmosphere

	Very Pessimistic	Pessimistic	Realistic	Optimistic
Cost per change in metric ton of CO_2e (positive equals decrease in CO_2e)	-$1.04	$1.53	$0.15	$0.07
Change in CO_2e per dollar (metric ton of CO_2e/$)	-0.96	0.65	6.70	13.72

When we used Guesstimate, our example run found that the 50th percentile for cost per change in CO2e is predicted to be about $0.20 per metric ton of CO2e across the thousands of simulated futures (Figure 2). The 95th percentile is predicted to be $1.62 per metric ton while the 5th percentile is predicted to be -$0.19. Because negative values are predicted to occur below the 6th percentile, our "Very Pessimistic" scenario is highly unlikely to happen.

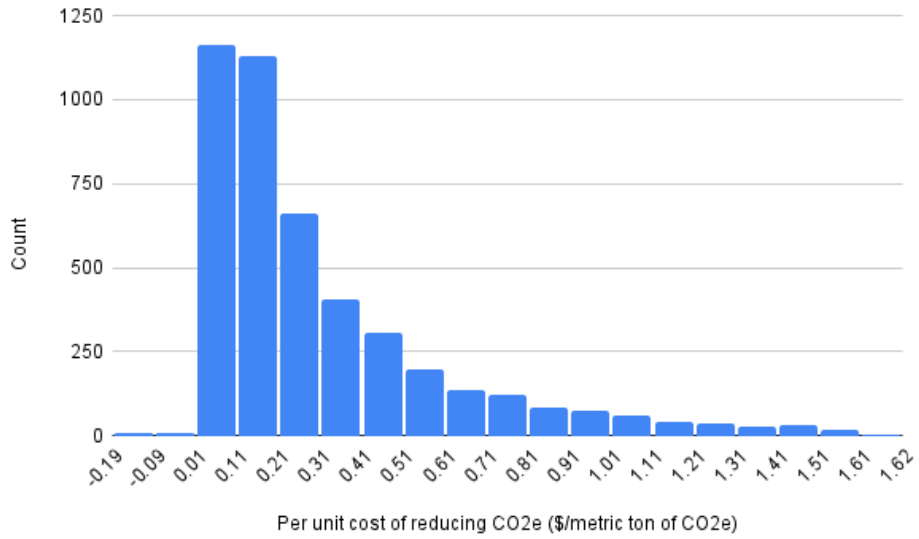

Figure 2: Histogram of the cost per change in CO2e. The x-axis is truncated and includes values between the 5th and 95th percentiles.

Our Guesstimate model predicted that the 50th percentile for change in CO2e per dollar is about 4.3 metric tons per dollar. The 95th percentile and 5th percentile are predicted to be about 22.7 and -0.1 metric tons per dollar, respectively.

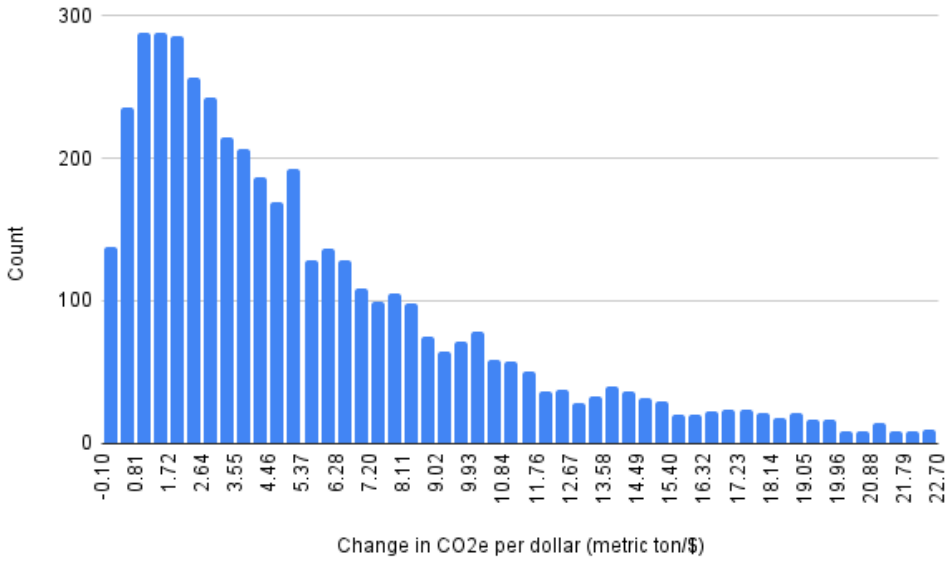

Figure 3: Histogram of the change in CO2e per dollar. The x-axis is truncated and includes values between the 5th and 95th percentiles.

Discussion

Comparing activism's cost-effectiveness against insider policy advocacy

It seems likely that donating to climate change activism could be as cost-effective as donating to a best-in-class insider policy advocacy organization. Namely, our cost-effectiveness estimates for activism were on par with our estimates for Carbon180 and Evergreen Collaborative, two high-performing insider policy advocacy organizations. Using our Pessimistic and Optimistic scenarios for Carbon180 as bounds, Carbon180 is predicted to remove CO2 from the atmosphere at a cost somewhere between $0.24 and $3.47 per metric ton. Similarly, we estimated that Evergreen Collaborative would remove CO2 from the atmosphere at a cost somewhere between $0.18 and $1.08 per metric ton. There is therefore some overlap in cost-effectiveness between activism and these two insider policy advocacy organizations. However, activism could potentially either increase CO2e or not have an effect at all, which is not a risk that either insider policy advocacy organization shares. This risk though is very low given that negative values for the cost per change in CO2e were below the 6th percentile in our Guesstimate model.

Uncertainty in the CEA model

As with many models, our CEA model has many sources of uncertainty and should be taken as indicative only. Below, we list some particular factors where our model may have erred.

Change in probability of climate bills passing due to activism

The most uncertainty in our CEA model came from our estimates for how much activism changed the probability of climate bills passing. Our model is most sensitive to activism's effect on the progressive bill. For example, it is possible that activism could only increase the likelihood of a progressive bill passing by 0.5% instead of 5% under the Realistic case. This would increase our cost-estimate to $1.23 per metric ton,

which is more than a seven-fold increase in price. Our cost-estimate was less sensitive to changes to the bipartisan bill's probability of passing. For example, changing this probability for the Realistic case from 1% to 0.01% did not affect the cost per change in metric ton of CO2e.

Reductions in CO2e emissions

There is uncertainty on how much activism actually reduces total CO2e emissions. For example, our CEA likely underestimated the total reduction in CO2e emissions because we did not include all of the Infrastructure Investment and Jobs Act and Build Back Better Act's climate provisions. It is also possible that the studies we used to estimate long-run impacts of the bills could have had incorrect assumptions.

In particular, it is possible that we underestimated the bipartisan bill's reductions in CO2e emissions. Namely, some of its provisions, such as R&D, will play out over long time periods with great uncertainty. Because we focused on emissions just from 2022 to 2030, this dynamic was excluded from our model. But we agree it could have significant long-term effects, and also very successful technologies could spill over globally and have outsized impact. However, it is difficult to know if this is the case and model it with any kind of confidence.

We found that changing the amount of CO2e emissions only had a moderate effect on activism's cost-effectiveness. For example, if we had underestimated reductions in CO2e emissions by 50% for both bills, our corrected cost-estimate for the Realistic case would decrease from $0.15 to $0.10 per metric ton, which is a decrease of about 33%. Conversely, if we had overestimated reductions by the same percentage, the corrected cost-estimate would increase to $0.30 per metric ton. This doubled cost is still relatively inexpensive and remains comparable to CATF's cost-effectiveness.

Estimated cost of activism

We assumed that the Sunrise Movement's revenue would be an appropriate proxy for estimating activism's cost and that its revenue would be equal to its budget in 2020. However, we are unsure of our assumptions' accuracy. This impacts our cost-estimates because our cost-estimates are directly proportional to activism's cost. For example, doubling the cost of activism would double the Realistic case's cost-estimate. Even if the cost of activism were ten times greater than what we estimated, the cost per change in activism would only reach $1.49 per metric ton of CO2e, which is still fairly inexpensive.

Possible negative impacts

There is a chance that activism could have a negative impact on GHG emissions. Per our model, this would require (1) bipartisan bills to have a high impact relative to progressive bills and (2) activism to have a negative impact on bipartisan bills being passed. Because both of these requirements seem unlikely to us, the overall likelihood of activism having a negative impact on climate change is probably low.

We admit it is possible that we may be underestimating the long-term effect of bipartisan provisions, given that we may be underestimating the climate impact of R&D, which has been included in recent bipartisan bills. For instance, R&D investment into carbon capture could significantly reduce the technology's cost over time. However, even if bipartisan bills are more impactful than what we estimated, this is not enough to make the effect of activism negative. For this, we also need to assume that activism decreases the change of bipartisan bills passing, which we think is unlikely.

Conclusion

According to our CEA model, donating to climate change activism could be highly cost-effective in reducing CO2e emissions. For example, under the Realistic scenario, donating to climate change activism could reduce CO2e emissions at a cost of $0.15 per metric ton, which compares favorably with estimates of the most cost-effective charities.