Appendix: Estimated leverage based on different political environments

Here we explain in more detail how estimated the leverage of climate philanthropy in different scenarios.

The value proposition of US climate policy lies in facilitating global decarbonisation

Understanding the relative leverage from different political scenarios requires first to clarify what the value of different policies feasible in such different scenarios is.

By example, to answer the question of how much better it would be for climate philanthropy if Democrats controlled both chambers of Congress and the Presidency -- the so-called “trifecta” -- we need to map policies feasible in such a case to plausible decarbonization outcomes.

As we have argued elsewhere, we are quite certain that the primary value of US climate policy, even if domestically focused (i.e. non-foreign-policy), lies in facilitating global decarbonization and the uptake of carbon removal[1].

This is for a number of reasons, including the US’s declining share in global emissions, the US’s prowess in driving energy innovation, and its potential leadership role (and felt absence) in international climate policy.

This means that -- when evaluating feasible policies in different scenarios -- we are *not* primarily interested in “*how much does this reduce emissions in the US?*” but rather in “*how much does this help global decarbonization via direct and indirect effects?*”.

---

[1] For short-hand we will sometimes only write “decarbonization” in the remainder, as well as talk about “energy innovation” rather than “energy innovation and innovation around carbon removal”. Our arguments are always meant to include both, except for if otherwise indicated, and we see “carbon removal” as one of the most neglected technology groups, which motivates our recommendation of Carbon180 as a top philanthropic opportunity.

While quite a bit more uncertain than questions about direct domestic effects, we think that in a world of rising energy demand shifting away from the OECD, it is much more valuable to be roughly right about indirect effects rather than more precise about domestic effects while, implicitly, treating international effects that carry most of the value as zero.

How can the US facilitate global decarbonization?

This begs the question of how the US can facilitate global decarbonization.

We think there are two primary pathways:

1) **Policy leadership:** The US can be a leader in international climate policy and that can make other countries raise their ambition and/or adopt specific policies adopted in the US. Insofar as this is foreign policy, the power to be a leader rests with the Presidency, though -- of course -- insofar as credible foreign policy requires signaling success in the United States as well as budgets for international climate finance, Congress is also important.

2) **Innovation:** The US can play a decisive role in global decarbonization by reducing the cost and performance of low-carbon energy technologies and carbon removal solutions. Innovation can be promoted though a host of policies, not only policies labelled primarily as such, but -- compared to climate foreign policy -- these policies will be relatively more dependent on Congress.

With these pathways clarified, we are now in a position to analyze how the leverage they present is affected by different political environments.

Policy leadership opportunities under different political environments

President-elect Joe Biden has made it clear that he intends to lead on international climate policy and, as far as foreign policy is concerned, he can do so without much interference from Congress (his climate envoy, John Kerry, does not require Senate approval).

As mentioned above, however, making credible commitments on domestic emissions reductions requires favorable political majorities in Congress.

The only way to *guarantee* that the US legally commits to a climate target that is not susceptible to changing administrations would be a law passed with a 60-seat majority in the Senate (*filibuster-proof*). The last time this was tried, in 2009 and 2010 with the American Clean Energy and Security Act, this garnered zero Republican senators in support. Given that, at best, Democrats will have 50 senators in 2021 and that the President's party usually loses senators rather than gaining them, we think it is safe to assume that this will not happen this decade and, if it happens next decade, it will be far less useful.

From this perspective, that is also known to governments across the world, it is clear that -- absent fundamental changes to American politics (such as an abolishment of the filibuster) -- a US President cannot credibly commit to climate targets beyond his/her administration, setting climate targets via executive action would always be open to later challenge by a new President.

How we model this

It seems safe to assume that a Democratic President will be more engaged on climate than a Republican President, if only for stronger electoral incentives (even a pro-climate Republican such as the late JohnMcCain would have gained less electorally from international climate leadership than Obama did).

We think a ratio of 3:1 in terms of the value of a Democratic vs. Republican President is a good approximation. While this might seem favorable to Republicans, Trump was certainly much worse than 3 times as bad for US climate leadership than Hillary Clinton would have been, this does reflect the expectation that incentives for Republican leaders are changing so that there could be Republican Presidents elected in the 2020s that are fairly close to Democratic Presidents in terms of international engagement on climate.

In terms of legislative politics, we also assign a value of 1 to a Democratic trifecta, meaning that a Democratic President who also has control of the government has a value of 4 (more signaling), and a value of 0.5 to a situation of divided but cooperative government.

We also need to define a ratio of the value of advocacy on climate leadership compared to advocacy on energy innovation discussed below.

We think that overall, because (1) climate foreign policy is far less politicized than domestic climate policy and (2) the State Department and foreign policy apparatus more generally have a lot of resources and private information and relationships, there isn't a very clear case for advocacy to improve outcomes here, certainly much less so than for domestic policy.

Because of this we set the ratio of policy leadership to energy innovation to 1:5. Crucially, this does not mean that we think that energy innovation is 5x as valuable as policy leadership. We make no claim about the relative usefulness of either. It just means our best guess is that advocacy on energy innovation will, everything else being equal, be 5x more valuable because there is a clearer case how advocacy can optimize energy innovation outcomes compared to policy leadership outcomes.

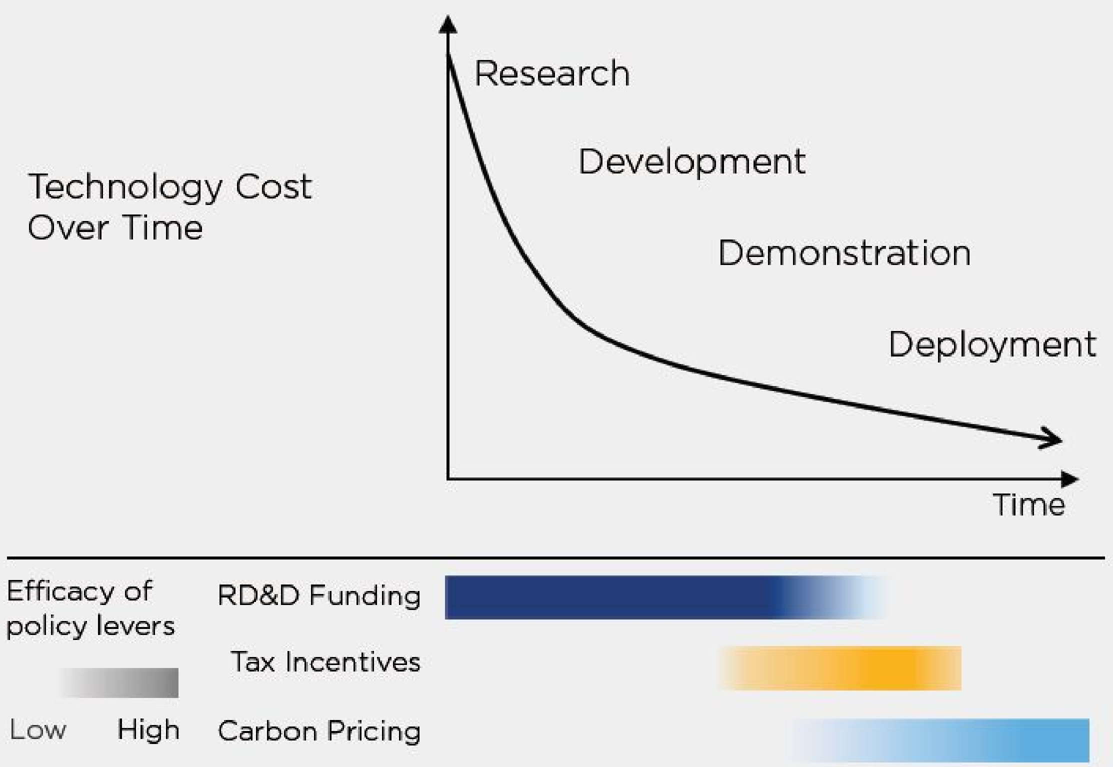
Energy Innovation opportunities under different political environments

In structuring this discussion we heavily draw on Energizing America, a recent report by leading innovation scholars at Columbia and ITIF outlining the case and priorities for clean energy innovation policy in the United States. If not indicated otherwise, graphics in this section are from this report, though the surrounding analysis is our own.

Energy innovation policy in the broad sense understood here -- every policy that has major implications for energy / clean tech innovation outcomes -- can happen in a variety of ways, from purchasing decisions by the federal government (under control of the executive) to spur early deployment of new technologies pushing them down the learning curve, to budgetary appropriation processes designating funding for different programs, tax and tax credit policy, as well as legislation such as clean energy standards.

A graphic from *Energizing America* illustrates this, showing that there are critical and effective policy levers across the entire innovation chain, from basic research to early deployment:

FIGURE 2-6: Efficacy of selected policy levers in supporting the various stages of clean energy innovation



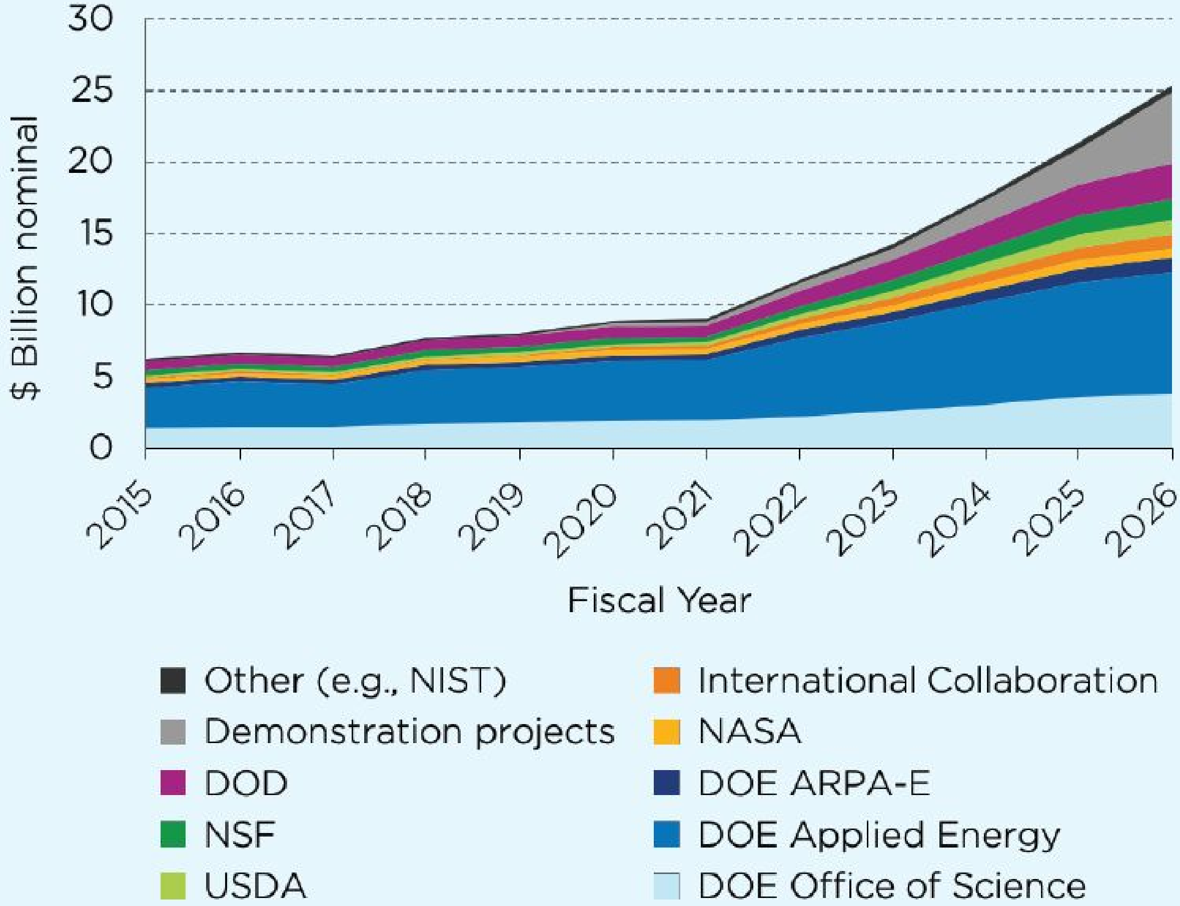
Source: Columbia University

We go through those policy levers in turn to understand the value of different political environments for advocacy related to these policy levers.
We differentiate between three types of policy -- basic R&D policy, “valley of death” policy, and early deployment policy, with definitions and explanation below.

Policy on basic research & development

The “earliest” in the innovation chain this kind of policy has historically been one of the most bipartisan pillars of climate policy in the United States. We can see this in historical budgets following a modest increase relatively unmoved by Trump’s 2016 victory or other changes in the political environment (not that this includes “demonstration”, but this is less than 5% of spending so this budget is an accurate representation of R&D spending, demonstration will be discussed in the next subsection).

FIGURE ES-2: Historical clean energy RD&D funding by federal agency and proposal to ramp up to an annual clean energy innovation budget of $25 billion by 2025



In terms of advocacy value, we think this has two main implications:

First, because government agencies have some leeway in spending of budgets and because the spending level seems relatively invariant to Congressional majorities, Presidential control is very valuable for RD&D policy.

Second, while there seems to be bipartisan support for some level of energy innovation policy the step change considered necessary by leading experts is *not* a business-as-usual scenario.

Achieving this level of sustained increase in funding seems more likely in a Democratic-leaning environment alongside increasing support from moderate Republicans.

How we model this

We think that a Democratic Presidency is, in expectation, 3x better for this type of policy than a Republican Presidency, given a stronger focus to maximize the climate impact of energy innovation spending.

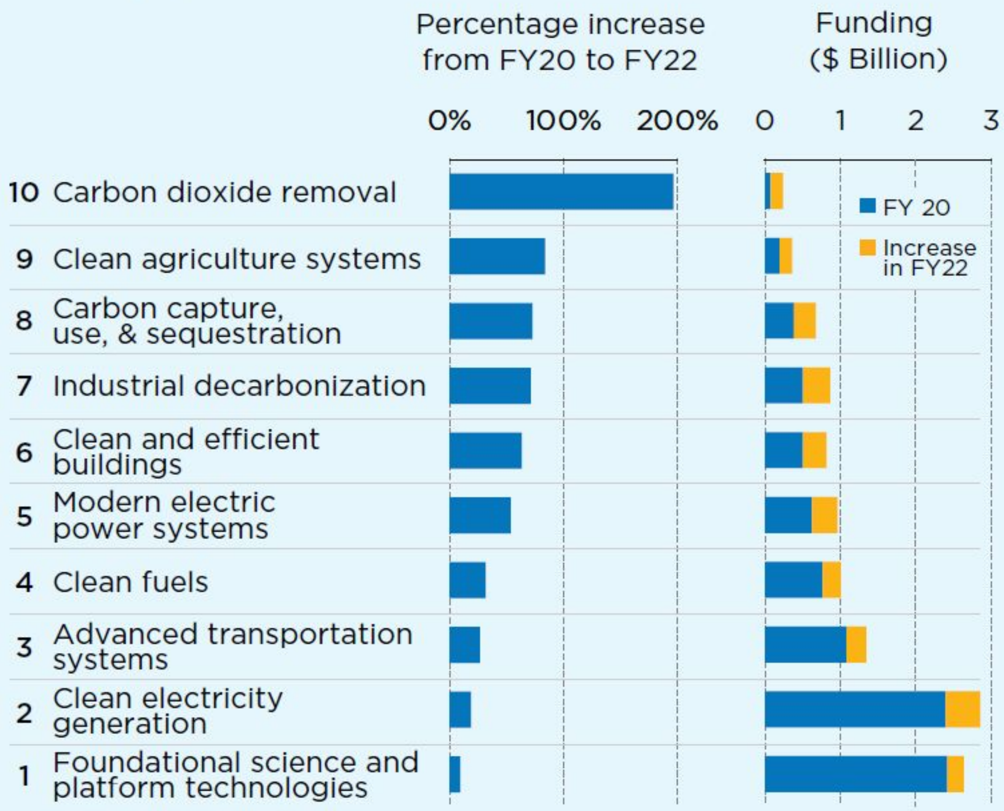
We also think that if there is a Democratic trifecta, the value of RD&D policy could double as increases in overall funding levels seem more likely. Other political environments appear neutral, as the trend in increased innovation funding has been a steady one, we model them as ⅓ as useful as a Democratic trifecta environment.

Ultimately, of course, as above we are *not* interested here in the value of policy, but in the value of advocacy to improve such policy.We think that RD&D policy is one of the key levers where advocacy can be extremely impactful for two reasons:

First, it is an area that profits a lot from technical expertise as well as political savviness to build coalitions, both of which can be supported by advocacy organizations.

Second, while Democrats are more inclined to support more ambitious climate action, this does not necessarily translate into better prioritization with regards to which solutions to focus on. We can see this in the graph below, where many of the top priorities for increased innovation effort are technology groups, such as carbon dioxide removal and carbon capture, that are controversial with at least some Democrats, while a top political priority -- increased support for renewables -- is second-to-last in terms of needed increases in innovation funding.

FIGURE ES-3: Proposed FY22 federal energy innovation budget by technology pillar, compared with FY20 levels



Thus, there is a strong potential to improve resource allocation through advocacy. Crucially, all of the top four innovation priorities are important foci of our top-recommended charities, with Carbon180 focusing on the first two top priorities, CATF being engaged across most of those areas with strong foci on carbon capture, industrial decarbonization, and clean fuels, and TerraPraxis focused on advanced nuclear as a cross-cutting technology for industrial decarbonization, clean fuels, and electricity.

Policy in the valley of death

The “valley of death” is a part of the innovation pipeline that is known to be critical, yet underfunded by both private actors and the public sector, as it lies between basic research and development (which enjoys broad support) and being sufficiently close to market to be attractive for private investors.

Capturing the last “D” in RD&D, the value of death includes the “demonstration” stage. To get a more concrete sense of the substance and criticality of this stage, it makes sense to quote from *Energizing America* (p. 77-78, emphases ours):

> “**Shepherding clean energy technologies from conception to commercialization will require a holistic, coordinated strategy by policymakers to support all stages of the innovation pipeline.** It is not enough for the federal government to only fund basic research and expect the private sector to take over thereafter. Multiple gaps in private funding, or valleys of death, exist on the road to commercialization. [...] **Of these three stages** [research, development, and demonstration], **demonstration is the most seriously underfunded** (see Chapter 2). [...] **As a result, a yawning valley of death can swallow firms that lack the capital to demonstrate promising clean energy technologies that they have developed. Yet today, the federal government devotes less than 5 percent of its energy RD&D funding to demonstration projects.** Most of that funding is for a single DOE program to demonstrate advanced nuclear reactors. Demonstration projects are the most capital-intensive innovation stage,often costing hundreds of millions of dollars for a single project. But when they are successful, the benefits can be very large. For instance, federal loan guarantees for the first five utility-scale solar power projects in the United States jumpstarted a decade-long boom in massive solar projects. Today, solar power is the fastest-growing power source in the country.”

There are a variety of policy approaches that can overcome this obstacle, such as tax credits for demonstrating innovation solutions (e.g. 45Q for carbon capture), direct funding for demonstration projects, loan guarantees, and other mechanisms to de-risk funding.

We believe there are four key characteristics of this domain with regards to advocacy value in addition to the conclusions on basic R&D above.

First, as the quote above highlights, this area is more severely under-funded than basic R&D, likely a result of its greater risk for policy makers ("picking winners" and *very* public failures, such as Solyndra) and a lower level of bipartisan support.

Second, as required budgets are much larger and the policy toolbox includes much more than "just" budget, this area appears more dependent on Congressional majorities -- to increase funding levels and develop policies -- than basic R&D policy.

Third, it appears somewhat more partisan and thus -- within Congressional politics -- likelier to succeed in more Democratic-leaning environments.

Fourth, however, not all policy instruments in this space are equally polarizing, as some policies in this space -- such as tax credits for innovation or specific technologies -- have enjoyed more bipartisan support than direct demonstration projects.

Given the very large need for increased funding and the greater political complexity for building coalitions than in the case of basic R&D, we see a relatively higher value for advocacy in this area than in basic R&D.

How we model this

Compared to the case of basic R&D policy, we model this as relatively more dependent on legislative politics and more strongly dependent on whether there is a Democratic trifecta or a divided but cooperative government compared to an obstructionist divided government or a Republican trifecta.

For example, while for basic R&D we model the difference between a Democratic trifecta and an obstructionist divided government as 3:1, this ratio is 4:1 for "valley of death" policy.

Similarly, in a situation of unified Democratic government, we model the main benefit for value of death policy from the Congressional majority, whereas for basic R&D the ratio between direct control from the executive and control of Congress is even.

Deployment policy

Lastly, deployment policy -- such as deployment subsidies, government purchase commitments, clean energy standards or other policy levers that make almost competitive technologies competitive with fossil alternatives -- is another lever of innovation policy, driving down learning curves by increasing deployments of new technologies.

We estimate that advocacy value in this area is lower than in the other areas, because economic interests are more mature -- they have their own lobbies. In addition, policies useful in this space -- such as moderate carbon pricing policies, technology standards, or subsidies -- have generally proven to be more likely to emerge rather than a well-functioning energy innovation system.

In addition, a lot of the positive effects of deployment policy for global decarbonization -- e.g. learning by doing -- do not necessarily require US federal policy, US states or other countries can play important roles there, whereas the federal US innovation system, both public and private, is not as replaceable (the example that comes to mind is Norwegian demand for Teslas), which pushes us to a view where basic R&D policy & valley of death policy are both more important and more influencable by advocacy.

How we model this

In terms of relationship to different political environments, we model it similarly to policies in the "valley of death", albeit with a stronger dependence on Congress.

Integration

Integrating these different considerations, we weigh the advocacy value of “valley of death” policy highest (at about 50% of the overall value), followed by basic R&D policy (about 30%), and about 20% for deployment policy.

Crucially, this is not a statement about the relative importance of these different policy stages, but rather a statement of where we see the largest value of additional advocacy.