

The Global Politics of Climate Change: Challenge for Political Science

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I am honored to have been chosen as the James Madison Lecturer for 2014. In considering my topic I quickly decided on the global politics of climate change because it is becoming increasingly clear that climate change is one of the major political and institutional, as well as ecological, challenges of our time. When—not if—the ice sheets covering Greenland and Antarctica melt significantly and the warming oceans expand, sea levels will rise. Climate warming probably will also cause stronger storms and other forms of extreme weather; agricultural production will suffer, especially at extreme levels of climate change. Such sea level rise could lead to the inundation of areas in which more than a billion people live, mostly in Asia. The implications of climate change are not simply minor adjustments in life-style, increased seasonal discomfort, and shifts of flora and fauna toward the poles, but major disruptions in human life as well as in natural ecology.¹

In view of the magnitude of climate change, it is distressing to observe the slow response from political science as a discipline. Debra Javeline has documented the unhappy fact that although extensive work is being done on adaptation to climate change, virtually no contributions have been made by political scientists—despite the importance of politics in adaptation. Javeline lists 15 relevant topics, none of which is explored in any depth in the published literature (Javeline 2014, 420–34).

With respect to mitigation—reduction of emissions of CO₂ and other greenhouse gasses—the situation of contemporary political science in the United States has until recently not been much better. Economists have made important contributions (Barrett 2003; Aldy and Stavins, ed., 2007; Nordhaus 2014). The late Elinor Ostrom was a pioneer in studying issues involving the global commons (Ostrom 1990), and toward the end of her life she turned her attention to polycentric approaches to climate change (Ostrom 2009). And some European political scientists have been more active in analyzing these issues (see, for instance,

Battig and Bernauer 2009; Biermann, Patterg, and Zelli 2010). In the United States, however, although there has been some outstanding work by senior political scientists, the list is short. David Victor has been a major voice on this issue (Victor 2001; Victor 2011) and Oran R. Young (1989) has also been a leader in sophisticated political science work on global environmental issues (see also Aklin and Urpelainen 2013; Hoffmann 2011; Mitchell 2010, Roberts and Parks 2007). But few major political science departments in the United States have someone on their faculty whose principal research concerns climate change—although for the future of humanity climate change is at least as important as other topics that receive much more attention, including international trade and human rights. Compare our slight attention to climate change, at least until very recently, with the enormous attention the profession paid to an earlier existential threat to the planet—nuclear war.

Yet there is hope. Jessica Green (2014) has recently written a fine book on private authority in global environmental governance, and Stephen Ansolabehere and David Konisky have explored American public views on energy and climate change in depth (Ansolabehere and Konisky 2014). Important new work has just been published, or is forthcoming, from a cohort of relatively young political scientists (Bulkeley et al. 2014; Hadden 2015; Hale and Roger 2014; Roger, Hale and Andonova 2014), and more forthcoming work may exist of which I am not aware.² A vibrant journal in the field, *Global Environmental Politics*, has been published by MIT Press since 2001. The fact that much of this work is by relatively young scholars is very encouraging. I hope that there is more major work by political scientists on this subject that I have either missed or that is forthcoming.

When I selected climate change as my theme for the James Madison Lecture, my first impulse was to reread the *Federalist Papers*. I greatly admire Madison as a political theorist for his clear understanding of the role of self-interest in politics and the importance for behavior of individual incentives. The *Federalist Papers* are a landmark in the development of a pluralist theory of politics that culminated in the work of Robert A. Dahl.

So I reread *The Federalist*, but to my surprise, I did not find fresh insights pertinent to an analysis of climate change. Indeed, what most struck me about its analysis is what it *misses* about politics that is relevant to the climate change problem. Politics in *The Federalist* stems principally from individuals' assessments of their own interests and their pursuit of these interests, within a given institutional structure. Often these individuals lack good judgment—especially when they oppose the Constitution on the basis of chimerical fears—so they are not perfectly rational.

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Furthermore, relatively few of them reliably look to the public good: “Enlightened statesmen are not always at the helm” (*Federalist* #10). Institutions, therefore, must be carefully constructed to guard against “the ambition and jealousy of each other,” (*Federalist* #8, 49) so that “ambition is made to counter ambition” (*Federalist* #51).

My perspective here is like that of the authors of the *Federalist* in one respect: I seek to think about how to design policies and institutions that would create *incentives*, based on perceived self-interest rather than altruism, to act more effectively to mitigate climate change. But two other crucial components of my analysis are largely missing in *The Federalist*. There is no discussion of what we would now call public goods, and there is little attention to problems of uncertainty. The problems with which *The Federalist* is concerned arise from every-day personal experience. There is little uncertainty about cause and effect and no need for technical expertise, or for the public to understand difficult scientific issues.

Therefore, my initial hypothesis that James Madison would have developed insights directly relevant to climate change was false. When one rereads *The Federalist* with climate change in mind, what stands out is the *absence* of attention to issues of public goods and uncertainty. Even for this James Madison Lecture, for insights into this problem we must look elsewhere.

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RESPONSES TO CLIMATE CHANGE: FIVE FRAMINGS, FIVE DIFFERENT POLITICS

Climate change is a global problem, but effective action requires that governments decide to act; therefore, domestic politics as well as international politics are involved. The political economy of policies to respond to climate change varies greatly depending on the policies proposed. As we will see, five different sets of policies generate five different “policy frames.” The crucial point is that each frame generates a distinctive type of politics—both international and domestic.³ The five policy frames follow:

- 1) *Mitigation*—emissions limitation—with the costs borne by current consumers and taxpayers, which in democracies means by voters;
- 2) *Adaptation* so that human beings can live in a warmer climate;
- 3) *Building new infrastructure* to generate electric power without emissions of CO₂, or even to remove CO₂ from the atmosphere through a technology known as “*direct air capture*,”
- 4) *Solar radiation management*—putting particles into orbit to reflect sunlight and reduce temperatures on Earth;
- 5) Finally, *mitigation* structured to reduce incentives for opposition.

The five frames are not exclusive—indeed, we should expect some combination of them. But by themselves they lead to radically different politics. Mitigation with provisions that impose costs on current voters generates malign incentives: everyone has an incentive to shirk so others pay a greater share of the cost. That is, the politics of Kyoto-style proposals imparts a bias toward

too little action. As Mike Hulme wrote five years ago, framing climate change as a “mega-problem” has “led us down the wrong road, ... creating a political log-jam of gigantic proportions” (Hulme 2009, 333). The complexity of the international negotiations is extreme, and from a domestic political standpoint, we have framed climate change as a global mitigation problem requiring increased payments by the median voter in the current generation.

The result is a malign politics of too little action. To a political scientist, this process seems a little bit like driving one’s car into a brick wall rather than trying to drive around the wall. What other framings could be more conducive to effective action? Because reduction of emissions is crucial to solving the climate change problem, toward the end of this lecture I ask how we could re-frame the mitigation issue. But first, let me ask whether we could make progress by shifting from mitigation to another framing entirely: adaptation, building infrastructure, or solar radiation management.

A key reason to consider a new framing of the climate problem is that this bias toward inaction is not inherent in all measures to cope with climate change. Indeed, such a bias is not apparent with respect to adaptation, infrastructure-creating measures such as direct air capture, or solar radiation management. Furthermore, as I discuss toward the end of the lecture, this malign politics is not inherent in the mitigation framing, but only in framings that

impose costs of mitigation on current voters. The politics of mitigation could be much transformed with mitigation framings that paid attention to incentives.

Here is my theme: thinking about climate change *as political scientists* could help shape better decisions about public policy. I emphasize, as Madison did, the *incentives* facing political actors, without discounting their normative beliefs and how they interpret ambiguous situations.⁴

FRAMING CLIMATE CHANGE AS A GLOBAL MITIGATION PROBLEM WITHOUT ATTENTION TO INCENTIVES: TOO LITTLE ACTION

From the outset, advocates of taking effective action against human-induced climate change focused on global governance. Within a decade of the first public action on climate change in the late 1980s they had created a formidable set of institutions. The Intergovernmental Panel on Climate Change (IPCC) studies and reports on the science, and states acting under the UN Framework Convention on Climate Change can make binding rules, although only under a cumbersome consensus process. The Kyoto Protocol to the Framework Convention specified these rules and how they would apply to individual countries.

In the intervening years, the scientific consensus on the seriousness of the climate threat has increased. The IPCC’s recent report states that “In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans” (IPCC WGII 2014, 6). But along with this reduction in uncertainty about the existence of anthropogenic

climate change, an *increase* in uncertainty about the magnitude of its effects emerged. For instance, scientists are more uncertain than 10 years ago about whether the Antarctic and Greenland ice sheets could become unstable, generating massive sea level rise.⁵ Bad news keeps coming.

Yet 17 years after the conference that created the Kyoto Protocol, efforts to construct a comprehensive climate change regime have failed, resulting in a “regime complex for climate change” rather than a coherent international regime (Keohane and Victor 2011). Although the European Union has enacted regulations that have created a price for carbon, even that price is very low, with carbon trading below \$10 per ton during the winter of 2014. Meanwhile, developing countries such as India and China keep building huge coal-fired power plants. Neither the United States nor China—the two biggest emitters—has enacted strong climate change legislation, and countries that had joined the Kyoto Protocol, such as Canada and Japan, have pulled back on their ambitions. Advocates of serious action on climate have recently lowered their sights, looking for “bottom-up” strategies to achieve something in the absence of comprehensive regulation by the largest states or an integrated international regime.

Framing climate change as a problem of mitigation without managing incentives worsens an inherent public-goods problem. Virtually everyone in the world would benefit from effective regulation that prevented precipitous increases in temperature and associated climate disruptions. Unfortunately, everyone would benefit *unconditionally*, regardless of whether they, or their country, made any contribution to solving the problem. Furthermore, reducing use of fossil fuels is costly. If everyone is to be a net payer, everyone has incentives to delay acting, hoping that others will solve the problem. A serious free-rider problem exists.

In world politics this incentive problem is sharpened by its trade and employment implications: in an open trading world, without special taxes on imports from low-regulation zones, states that fail to take costly actions on climate change gain competitive advantage. Failing to cooperate is a malign equilibrium.

Autocracies do not have a good record on climate change, but if the issue of mitigation is framed as a tax or the equivalent, democracy does not help very much (Battig and Bernauer 2009).⁶ The American Clean Energy and Security Act of 2009, providing for a cap-and-trade regime with a price on carbon, passed the US House of Representatives by a margin of seven votes,⁷ but never came to a vote in the Senate. Public opinion polling has mildly supported legislation in principle, but it has consistently shown climate change regulation to be low on voters’ lists of priorities. The important measures now being taken by the Obama administration to restrict building of coal-fired power plants are by executive action under an interpretation of existing Clean Air Act authority—not as a result of new legislation.

Three democracies previously committed to strong climate change policies have backtracked on the issue. Canada formally withdrew from the Kyoto Protocol in December 2011, effective December 2012. Its emissions in 2009 were 17% above 1990 levels, although the Kyoto provisions called for its emissions to be 6% below that level by the end of 2012 (Ljunggren and Palmer 2011). Japan is no longer a climate change leader, and the current Australian government has dismantled its predecessor’s strong policies.

Democracy is a very effective form of government for representing organized interests—of corporations, unions, and pensioners.

But it does not solve the international free-rider problem and does not assure representation of diffuse interests, much less those of future generations. Proposals for a carbon tax, or the equivalent, therefore run into three huge obstacles: they impose costs in the present to benefit, with some uncertainty, future generations; they run athwart the “no new taxes” mantra that has become so powerful in the United States; and they fundamentally threaten established industries, which can be expected to fight back. Henry Paulson, Secretary of the Treasury under President George W. Bush, has argued that climate changes poses risks that threaten our generation’s ability to leave the planet in better condition than we found it—on the analogy with a business leader’s commitment to leave his firm in better shape when he leaves than when he took over (Paulson 2014). But the analogy does not overcome the free-rider problem resulting from the fact that, unlike business risk, the risks of climate change are diffuse, and efforts to solve the problem help everyone in the world, not only those who invest in a company.

Advocates of taxation or cap-and-trade policies to limit emissions can hope that understanding the magnitude of the climate change problem will induce a strong and healthy sense of fear in democratic publics and elites everywhere. But in the absence of direct personal incentives for members of the public, or elites, such emotions are unlikely to induce willingness to pay—economically and politically—to provide a public good for everyone in the world, and particularly for future generations.

I have argued that framing climate change as a global mitigation problem requiring increased payments by the median voter in the current generation has generated a malign politics of too little action. What other framings could be more conducive to effective action?

FRAMING CLIMATE CHANGE AS AN ADAPTATION PROBLEM: DISTRIBUTIONAL POLITICS AND INJUSTICE

Adaptation means taking measures to reduce vulnerability to climate change (Javeline 2014, 420). Such measures could include barriers to storm surges to protect coastal cities such as London and New York, shifts in agricultural cropping to adapt to a warmer climate, and massive projects to bring water to highly populated but arid regions such as California. Because there is great variation in the degree of adaptation effort and the types of adaptation attempted, adaptation to climate change is a rich field for political science. The free-rider problem is much attenuated: communities have incentives to act because their own actions will help themselves.

From a political standpoint, expenditures on adaptation are entirely different from emissions taxes or higher energy prices as a result of cap-and-trade policies. Adaptation requires new infrastructure, and building infrastructure generates jobs and profits. Indeed, adaptation perfectly fits what pluralist democracies do best: respond to directly affected concentrated and organized interests with targeted benefits, and pay off other organized groups with benefits of their own.

Framing the issue as one of adaptation, *within a national or subnational context*, therefore generates a much more productive politics than framing it as one of mitigation, for the benefit of unknown distant generations. However, the picture at a global level is not so benign.

Insofar as the focus shifts to adaptation, issues of distributional inequality rather than public goods will come to the fore.

Many of the most serious issues will arise in poor countries—small island states and low-lying countries such as Bangladesh—that have weak capabilities to adapt. As a general rule, poorer economies are also more dependent on outdoors activities such as agriculture, fishing, and timbering that are particularly vulnerable to a changing climate.

These distributional inequalities will lead to a somewhat different kind of politics: demands from disadvantaged countries for help accompanied by claims of support from the rich countries, accompanied by relatively little actual aid. Regardless of promises to establish adaptation funds to help the poor, aid is likely to be meager and to be controlled essentially by the donors. Poor countries will respond to the paltry aid with resentment—magnified by existing postcolonial nationalism—and greater reluctance to take mitigation actions that have beneficial global effects. Rich versus poor conflict will be intense, and so will the rhetoric from poor countries. Effective action will be taken in those states with the capability to do so, but on a global basis it will be uneven, and social injustice and political discord will result.

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So on a global scale, adaptation has disturbing implications. For wealthy countries, it may be the path of least resistance because its domestic politics are benign. Adaptation avoids the global free-rider problem, it generates jobs and profits, and in the short term, in wealthy countries, is likely to reduce the impact of climate change on people's lives. Unfortunately, it implies highly unequal global effects and a politics of deep resentment on the part of knowledgeable people in poor countries that are vulnerable to climate change. Adaptation is therefore bad from the perspective of cooperative or stable patterns of interaction in world politics as well as for the long-term ecology of the planet. Political scientists need to analyze these potentially malign politics of adaptation.

BUILDING INFRASTRUCTURE TO REDUCE CLIMATE CHANGE

A third possible approach, emphasized by a major recent report on energy and climate (Global Commission on Energy and Climate 2014), suggests building a huge new infrastructure to produce clean power or to remove CO₂ from the earth's atmosphere, through techniques ranging from the removal of CO₂ from flue gas emitted by coal-fired power plants to removing it from ordinary air, a technique known as direct air capture. The politics of building infrastructure would be different from those of both mitigation and adaptation.

If infrastructure were built to remove CO₂ from flue gas or the atmosphere, the basic public goods problem would remain because such actions would reduce climate change for everyone in the world regardless of whether they contributed. As in the case of mitigation, a strong sense of fear would enhance the likelihood that states would pay for this technology. If technological progress made solar and wind power competitive with fossil fuels,

however, the public goods problem would disappear because firms would have self-interested incentives to generate power in this manner. Either way, plausible political efforts to finance large infrastructural investments would generate self-interested incentives by the relevant construction industries to support vigorous action.

When a large climate-industrial complex had been created, nationally or multilaterally, either for production of clean energy or removal of CO₂, momentum for large and continuing expenditures would continue because it would be in the interests of the relevant industries. Perhaps the best analogy is the politics of defense in the United States both between 1950 and the end of the Cold War and after the terrorist attacks of September 11. This analysis implies that the *politics of infrastructure* could be more benign than the politics of mitigation as attempted in the Kyoto Protocol process. A nascent clean energy industrial complex exists, centered on solar and wind power, but it remains weak.

Direct air capture has not been demonstrated even experimentally on a large scale, and a recent technology assessment from

the American Physical Society estimates, even with some quite favorable assumptions, that the cost of direct air capture is about eight times as high as the cost of capturing carbon from flue gasses at power plants. Their report estimates that 90% of all flue gasses could be captured at a lower cost than direct air capture. The essential problem is that only one molecule in 2,500 in the atmosphere is CO₂—300 times less than in the flue gas from a coal-fired power plant (American Physical Society 2011, 72.)

The benign politics of direct air capture and flue gas removal involving “carbon capture and sequestration” are shared by other technologies, such as building massive solar power capacity in Morocco or onshore wind power in Mexico. All of these technologies would generate interests in favor of their expansion. The politics of climate change could be reframed if there were an emphasis on huge infrastructural projects that created jobs.⁸

FRAMING CLIMATE CHANGE AS A SOLAR RADIATION MANAGEMENT PROBLEM

When faced with the free-rider problem associated with mitigation, the injustice of unequal adaptation, and the current infeasibility of economically competitive low emission technologies, it is tempting to solve the problem of global warming by reducing the amount of solar radiation that enters the atmosphere. Temperatures on earth could be markedly lowered as a result, as occurs naturally when enormous volcanic explosions emit huge quantities of ash into the atmosphere. One way of cooling the planet, therefore, would be to send particles into the upper atmosphere that would reflect sunlight away from the earth.

There are many uncertainties associated with such a strategy, and it would not affect the build-up of carbon within the atmosphere. As a result, certain processes associated with climate

change, such as ocean acidification involving the destruction of coral reefs, would continue even if ambient air temperatures, and ocean temperatures, were prevented from rising. From an ecological standpoint, solar radiation management is a last resort and is viewed with horror by many scientists.

I do not try to engage this debate here because its conclusion depends on scientific knowledge that I do not possess. Instead, I raise a different, more political, set of questions. What would the *political economy* of solar radiation management—or “SRM”—look like?

For some democratic politicians, and for authoritarian leaders bent on attaining maximum economic growth, solar radiation management may appear attractive. By crudely suppressing the temperature effects of increasing CO₂ levels, it could appear to solve problems of global warming in the short run—the relevant time span for democratic politicians from an electoral standpoint—and it could do so cheaply, which could be crucial for leaders of rapidly growing but still relatively poor countries. In democracies, politicians campaigning for a cheap “solution” to global warming could out-compete those demanding an expensive solution that would be more sustainable in the long term. And despite the scientific uncertainties, the use of

countries that could engage in unilateral SRM, such as India and Brazil, and, therefore, need to be included in a decision-making body. Any such regime should include an advisory council from civil society groups, chosen by other civil society groups through an institutionalized process that would ensure wide geographical representation. This organizational structure is only a sketch; much more thought and research would be necessary to create an institutional design that would be both politically feasible and effective.

Political science has a great reservoir of expertise relevant to issues of an international regime to manage solar radiation management: 60 years of work focused on arms control. Here I pass on a suggestion from David Victor, perhaps the leading political scientist working on climate change issues: “For all the arms controllers in the audience who are lamenting the lack of serious new regimes to study why not spend some time learning about SRM?”

It would be too optimistic to believe that we may be nearing a “constitutional moment” on climate change issues, comparable to the constitutional moment of 1787 in the United States. Nevertheless, the time to think about a solar radiation management regime is now, before political interests and bureaucratic pressures have accumulated. And who is better qualified to think about such a regime than political scientists?

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SRM could be rationalized as buying time for more effective long-term action.

However, only powerful states, able to withstand external pressure, could carry out these measures at relatively low cost. The notion that weak countries could use SRM unilaterally fails to consider the coercive pressures that could be imposed on such countries by more powerful states and groups of states that were opposed to SRM. These politics could look entirely different from those in the first three scenarios, indeed, more like international politics between rival states or blocs. Opponents of SRM would likely try deterrence and if that failed, could even take military action, such as shooting down the rockets that were carrying particles into the upper atmosphere. So the international implications of SRM are malign. In this respect SRM is like adaptation: benign domestic politics but malign international politics.

The likelihood that solar radiation management will be used by some powerful states, or a set of such states, during the twenty-first century should not be discounted. Building massive new infrastructure is very expensive, and adaptation is unlikely to be sufficient when sea-level rise threatens to wipe out island countries and threatens major cities. Governments will be tempted to turn to SRM as “the magic bullet” and to rationalize it as a strategy for buying time.

It would therefore be worthwhile now to begin to think about an international regime to control uses of solar radiation management (Lloyd and Oppenheimer 2014). Because these efforts would affect the whole planet, they should be authorized by a collective global body with legitimate authority to make decisions, rather than by one or a few powerful states. The Security Council is probably not the best such body because its archaic structure underrepresents

REFRAMING WITHIN THE MITIGATION FRAME

So far, we have reached a rather bleak set of conclusions. Mitigation as attempted so far, as in the Kyoto process, is politically malign because the incentives are wrong. Adaptation only responds to effects, largely in local terms, rather than addressing basic causes. Furthermore, this approach would magnify global inequality and probably generate new resentments. The infrastructural solutions would be enormously expensive and depend on the development of technology that is not yet available. Solar radiation management by individual countries generates both ecological and political costs. Constructing an international regime for SRM would be worthwhile, but it would be a daunting task in view of the conflicts of interest that surround it. In other words, *none of these approaches solves the problem*, or even comes close. These difficulties bring me back to the mitigation frame because mitigation is the clearest way to address these issues. Is there a way to reframe mitigation to get the political incentives right?

Autocracies are unlikely to take the lead on this issue; and as long as the United States fails to act effectively, they will have a good excuse, avoiding harm to their reputations. US action is a necessary—probably not sufficient—condition for China, the biggest emitter, to take mitigation seriously. Therefore, I focus on the United States.

First, I want to mention a proposal in Congress, labeled the Healthy Climate and Family Security Act of 2014, introduced by Representative Chris Van Hollen (D-MD), which parallels an earlier proposal by Senators Cantwell and Collins in 2009. This Act would impose a tax on carbon-emitting industries with a direct electronic rebate of the full amount of the tax on a *per capita* basis

to individuals (Van Hollen 2014). Although households would pay more for energy than they do now, exerting downward pressure on demand, they would be compensated by a check from the federal government, with equal amounts per capita. Large energy users would be net payers, moderate users net gainers. Because energy use—like income—in this country is highly skewed, a large majority of people would be net beneficiaries.

In other words, this framing could have the potential of “flipping” the median voter, who is not concerned about the future, from a net payer to a net beneficiary—and, I would hope, from an opponent to a supporter of increasing the price of energy. New research by Stephen Ansolabehere and David Konisky (2014, table 8.1, 183) provides some support for this hope: one of their experimental polls indicates that although the American public overwhelmingly rejects a carbon tax when proposed on its own, support rises dramatically when it is coupled with income tax reductions.⁹ I suggest that the greater tangible benefit of a check to every household could provide an even larger incentive for support. However, polling results heavily depend on the wording of questions, and on timing, so it would be unwise to put too much weight on these. Furthermore, before celebrating this approach too much, we need to recognize that in view of the low salience of climate change to ordinary citizens, the median voter model does not describe the current politics well. The EU emissions trading system (ETS), and the Waxman-Markey bill that passed the House of Representatives in 2009 but failed in the Senate have allocated emissions allowances and auction revenue to industries, responding to their political influence and reflecting the relevance of a more Olsonian interest-group model to this problem.

Another way of making this point is to consider three equilibria of the climate game.¹⁰ We are now in a bad equilibrium: little action. The EU Emissions Trading System (ETS) or Waxman-Markey approach, if successful, leads to another equilibrium: mitigation through energy price increases, with countervailing benefits flowing to concentrated interests. As climate change has low salience with voters, this may have seemed to be the most promising approach, but it did not work with Waxman-Markey and seems doomed now by a highly mobilized opposition. Yet if the salience of the issue could be increased, the rebate-check-to-individuals approach could be an equilibrium. In addition to its equity advantages, this approach has the appeal that, once implemented, it would be hard to reverse. A similar arrangement, with individuals receiving checks based on energy royalties, has become locked into the politics of Alaska. Even while cautioning against a naïve faith in the appeal of rebate checks and the pivotal role of the median voter, we should consider and continue to research such innovative proposals.

More generally, Theda Skocpol has powerfully argued that efforts need to be made to construct a broad grassroots coalition to press for climate change legislation: “The only way to counter right-wing elite and popular forces is to build a broad popular movement to tackle climate change” (Skocpol 2013). Thinking about building a popular movement raises the issue of *beliefs*. For climate change to be sufficiently salient to generate support for costly action, voters need to have a widespread understanding that they are part of a “community of fate,” whose members share a common understanding of the critical importance of this issue to the lives of their children and grandchildren. Political science has something to say about how beliefs are formed, maintained, and changed; we need to apply this knowledge to the issue of

climate change. In particular, we need to understand better how people think about nature. Recent work suggests that members of the American public have a strong aversion to what they see as pollution of the natural world and about their local environments, although they are much less intense about climate change (Ansolabehere and Konisky 2014, especially 13–15 and 171–75). It follows that activists who are concerned about climate change should especially support actions that both reduce local pollution and mitigate global climate change, rather than emphasizing only climate change.

There may be other possible framings for mitigation that also do not rely on altruism or concern for future generations. For example, especially in a low interest-rate environment we might consider ways of imposing the costs of emissions mitigation on the future generations who would be the beneficiaries in the form of long-term debt. The original principle behind US Social Security was that individuals’ savings would finance provision of future retirement income. The same principle could be used in reverse to justify the creation of long-term debt instruments specifically allocated toward climate mitigation, and kept separate from ordinary national debt.

The details of proposals are not important in the current context. In the long term, as I have noted, we may be able to harness emotions and to change fundamental beliefs toward a norm of not polluting nature. But climate change action needs to be taken soon. From this short-term standpoint, in view of the prevalence of self-interest as a motivation, and the short-term orientation of our society, we need to identify incentives and reframe the issue in productive ways.

Here is a role for political science in the climate debate. It is a role that we have not, so far, embraced as a discipline, although I am pleased to note that Representative Van Hollen holds an MPA from the John F. Kennedy School of Government. As a discipline we understand the role of incentives in politics, and we realize that short-term economic considerations are the most important general factor affecting election outcomes. We also understand the role of beliefs and expectations. We need to be imaginative in devising ways to take effective actions to mitigate climate change that do not threaten voters’ pocketbooks.

Political scientists could take on at least four tasks in the climate change debate:

- 1) *Analyze how to avoid the “paths of least resistance”* that I have identified: over-reliance on adaptation, building infrastructure, or solar radiation management. Over-reliance on any of these approaches would imply neglect of the politically more difficult but crucial problem of excessive carbon emissions.
- 2) *Creatively think about how to reframe issues of climate change* in ways that make political action feasible. Proposals for rebate checks or long-term bonds provide examples, but other ideas are worthy of attention. Related to these proposals, we could use our understanding of social movements to analyze the conditions under which a social movement built around climate change could generate momentum to push the issue into a positive equilibrium.
- 3) *Study the comparative politics of climate change*. Countries have adopted different approaches to climate change, both with respect to mitigation and adaptation, and we do not fully understand why. There is an intellectually vibrant comparative politics of economic policy and of human rights policy.

There should be a comparative politics of climate change policy. *Under what conditions* do which types of countries generate a constructive political discourse on this issue that helps to shape beliefs and expectations and that may lead to different types of action? Furthermore, we can ask, as Michael Aklin and Johannes Urpelainen have recently done, how actions by

Our society, and the world as a whole, will only thrive if people have incentives to mitigate climate change. As a discipline, we political scientists are best-placed to reframe climate issues in incentive-compatible ways. Doing so in an imaginative and sustained way is our responsibility and our great opportunity as a discipline.

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government at one time generate path-dependent sequences that lead to different political equilibria —“green” or brown” (Aklin and Urpelainen 2013). As part of this investigation, we should study how different political systems deal differently with uncertainty and risk.

- 4) More generally and conceptually, *study how emotions, including fear, play a role in human reactions* to long-term natural processes such as those involved in climate change. Nature does not strategize but its reactions are powerful. How is the fact that these are natural processes important in shaping human beliefs about the urgency of climate change and the importance of taking even costly action to deal with it?

These challenges are intellectually interesting as well as being important in policy terms. And if we engage in an imaginative discourse about the politics of climate change, more worthwhile challenges are bound to arise.

CONCLUSION

In a memorable speech at the meeting in 1946, in Savannah, Georgia, inaugurating the World Bank and the International Monetary Fund, John Maynard Keynes conjured up the image of a “good fairy” and a “bad fairy.” The good fairy would ensure the objectivity of the institutions; if the bad fairy prevailed, they would grow up as “brats,” politicized.

In framing climate change either the good fairy or the bad fairy could appear. If the bad fairy prevails, human beings will follow the path of least resistance. “Don’t worry,” the bad fairy says, “we can find a fix for this problem that does not require us to change our life-styles.” If the bad fairy is persuasive, the differential politics of framing climate change will distort policy. Reduction of emissions of gasses that warm the atmosphere will be set aside as unpopular in democracies whose publics, and politicians, have short time horizons. Ways of coping with the problem that generate positive political incentives, like infrastructure for adaptation, or that are cheap, like solar radiation management, will rise to the top of the political agenda. These strategies may seem to address the problem in the short term, but they will only postpone its consequences, and solar radiation management could provoke conflict.

The good fairy does not tell us to drive into walls or tilt at windmills. She is smart enough to recognize, as James Madison did, that people are generally self-interested and that they respond to incentives, within the context of their beliefs and expectations. She therefore advises us to use our imaginations and our analytical intelligence to reframe the problem.

ACKNOWLEDGMENTS

I appreciate the perceptive comments on earlier drafts of this lecture by Scott Barrett, Gary Bass, Thomas Hale, Peter J. Katzenstein, Nannerl O. Keohane, Nathaniel O. Keohane, Margaret Levi, Joseph S. Nye, Harold Shapiro, Theda Skocpol, Robert Socolow, Johannes Urpelainen, David G. Victor, and Keren Yarhi-Milo. ■

NOTES

1. The most recent documentation of the science of climate change is contained in the three 2014 reports of the Intergovernmental Panel on Climate Change (IPCC-AR5, 2014).
2. There is a vibrant literature in law journals, some of which, such as Abbott (2014) is by law professors who are actually very sophisticated political scientists, without benefit of a disciplinary PhD.
3. This general insight is not original. The classic reference is Lowi 1964.
4. For a profound meditation on normative issues involving incentives—including when incentives constitute the best approach and under what conditions the conditions attached to incentives are legitimate—see Grant 2012. As Grant writes (139), “incentives should not be the only tool in the policymaker’s toolbox.” But attention to incentives is necessary, even if not sufficient. I am indebted to Professor Margaret Levi, who attended my talk, for the perceptive observation that the original text under-played issues of beliefs.
5. I am grateful to David G. Victor for emphasizing this point to me.
6. Battig and Bernauer 2009 argue that the effect of democracy on levels of political commitment is positive but its effect on policy outcomes is ambiguous.
7. The American Clean Energy and Security Act of 2009 (ACES) passed the House on June 26, 2009, by a vote of 219–212.
8. On the variety of possible measures to help cope with climate change, see Pacala and Socolow 2004.
9. I appreciate personal correspondence with the authors about other polls they took, not reported in their book, that show different results.
10. I am indebted for this formulation to Nathaniel O. Keohane.

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Hughes, Terry P. Barnes, Michele L. Bellwood, David R. Cinner, Joshua E. Cumming, Graeme S. Jackson, Jeremy B. C. Kleypas, Joanie van de Leemput, Ingrid A. Lough, Janice M. Morrison, Tiffany H. Palumbi, Stephen R. van Nes, Egbert H. and Scheffer, Marten 2017. Coral reefs in the Anthropocene. The politics of global climate change are as complex as the science underpinning the debate. State, regional and multilateral efforts to address climate change differ in scope, focus and style. There is also great diversity in the social and legal systems in the states that have undertaken to regulate climate issues. Different countries have widely divergent histories, levels of wealth, economic conditions, cultures, and systems of government and laws, hence, they regulate environmental protection according to their own conceptions, legal instruments, and national norms. Some countries are more

The political economy of policies to respond to climate change varies greatly depending on the policies proposed. As we will see, different sets of policies generate different "policy frames." The crucial point is that each frame generates a distinctive type of politics—both international and domestic.³ The policy frames follow:

- 1) Adaptation so that human beings can live in a warmer climate;
- 2) Building new infrastructure to generate electric power without emissions of CO₂, or even to remove CO₂ from the atmosphere through a technology known as "direct air capture";
- 3) Solar radiation management—putting particles into orbit to reflect sunlight and reduce temperatures on Earth;
- 4) Finally, mitigation structured to reduce incentives for opposition.

The complex politics of global warming results from numerous cofactors arising from the global economy's dependence on carbon dioxide (CO₂) emitting fossil fuels; and because greenhouse gases such as CO₂, methane and N₂O (mostly from agriculture) cause global warming. Implications to all aspects of a nation-state's economy: The vast majority of the world economy relies on energy sources or manufacturing techniques that release greenhouse gases at almost every stage of production, transportation

Climate change is expensive, as the the Stern Review " compiled in 2006 by the eminent economist Nicholas Stern " showed. It argued that the long-term costs of inaction on climate change would eat up a significant chunk of the GDP, possibly 5"20% of the GDP each year. "Climate change presents a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen." Historically, growth and emissions were connected; however, Stern believes that this process can be uncoupled" Posner/Weisbach express a significant trust in science, economics and diplomats, assuming that they could establish the "optimal level of emissions reductions", which in turn could be implemented via an international agreement. Most of these climate changes are attributed to very small variations in Earth's orbit that change the amount of solar energy our planet receives. Scientific evidence for warming of the climate system is unequivocal. - Intergovernmental Panel on Climate Change. " Earth-orbiting satellites and other technological advances have enabled scientists to see the big picture, collecting many different types of information about our planet and its climate on a global scale. This body of data, collected over many years, reveals the signals of a changing climate. The heat-trapping nature of carbon dioxide and other gases was demonstrated in the mid-19th century.² Their ability to affect the transfer of infrared energy through the atmosphere is the scientific basis of many instruments flown by NASA. The politics of global climate change are as complex as the science underpinning the debate. State, regional and multilateral efforts to address climate change differ in scope, focus and style.¹ There is also great diversity in the social and legal systems in the states that have undertaken to regulate climate issues. Different countries have widely divergent histories, levels of wealth, economic conditions, cultures, and systems of government and laws, hence, they regulate environmental protection according to their own conceptions, legal instruments, and national norms. Some countries are mo