P&P Politics & Policy

The Wrong Solution at the Right Time: The Failure of the Kyoto Protocol on Climate Change

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This article argues that the Kyoto Protocol on climate change is a fundamentally flawed agreement that set back solutions on climate change by two decades. Using a systematic framework focused on compliance, efficiency, and effectiveness, I analyze the Kyoto Protocol and argue it is a clear case of institutional failure, with the design itself bearing substantial blame for this outcome. The study points to how particular features of the Protocol—its short time frame for action, binding targets, emission reduction measures, and provision for future commitment periods—have resulted in short-sighted behavior by member states and path-dependent structures that failed to make a substantial impact on the climate problem.

Keywords: Climate Change, Environmental Policy, Kyoto Protocol, Effectiveness, Policy Failure, Institutional Design, International Organization, International Cooperation, Global Warming, Greenhouse Gas Emissions, Global Problem Solving, International Agreements.

Acknowledgements: The author is grateful to Alexander Thompson, Victor Asal, the Research and Writing Group at Webster University, three anonymous reviewers, and the editors of *Politics & Policy* for their comments, and to Jesse Koons for his research assistance.

Politics & Policy, Volume 43, No. 1 (2015): 30-58. 10.1111/polp.12105
Published by Wiley Periodicals, Inc.

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Este artículo artículo argumenta que el protocolo de Kioto para el cambio climático tiene fallas fundamentales que han retrocedido las soluciones para el cambio climático al menos dos décadas. A través de análisis sistemático enfocado en el cumplimiento, la eficiencia y la eficacia, se analiza el protocolo de Kioto y concluimos que se trata de un claro caso de fracaso instutucional, con el propio diseño como unos de los principales culpables de este resultado. Señalamos cómo características específicas del protocolo—su corto periodo para tomar acciones, objetivos obligatorios, medidas para la reducción de emisiones, y la previsión de futuros compromisos—resultó en acciones con una visión de corto plazo por parte de los estados miembros y en estructuras dependientes a estas características que no lograron tener un impacto significativo en el cambio climático.

Under what conditions do international regimes actually solve the global problems they set out to? When nations signed the Kyoto Protocol to the Framework Convention on Climate Change in 1997, the response by the scientific community could be characterized as more resigned than celebratory. The prevailing opinion was that the treaty was inadequate to address the pressing issue of global warming, but others, such as Jorge Sarmiento of Princeton University, argued that the protocol was a "reasonable first step" and that it "provides a framework for revisiting the issue" (quoted in Malakoff 1997, 2048). Climate activists agreed. As Jennifer Morgan of the Climate Action Network put it, "[i]t's disappointing in terms of what it'll do for the environment. But we have a legally binding document. That's a start" (Lemonick 1997). The criticism mounted but focused mostly on the disappointing emission targets—an average of 5.2 percent emission reductions below the 1990 levels—and on the perceived negative economic implications of the agreement. Negotiators celebrated, and for many the problem of climate change could be temporarily moved to the "solved" column.

More than 15 years later, in the face of continued global emission increases we now know that this status change was woefully premature. Blame for this is laid at many doors, including those of states who failed to ratify the Protocol (the United States), the prevaricators who participated extensively in negotiations, withdrew from the process, and then rejoined the regime (Australia), and those who were not required to cut emissions at all (e.g., China, India, and the rest of the developing world). The real culprit, however, is not the states that failed to join but the very design of the treaty itself, which stacked the deck against success in mitigating climate change now and in the future. In this

article, I argue that the Kyoto Protocol was the wrong solution at the right time—not simply inadequate in its scope, but carrying high opportunity costs that derailed global efforts at achieving stable atmospheric concentrations of greenhouse gases (GHGs). The concern is not simply that the Protocol failed in even its minimal effort at reducing global emissions. The real crime of Kyoto is that it has subjected the world to an ineffective path-dependent model for solving climate change. In addition to contributing to Kyoto's own half-hearted performance, many of the principal design features have persisted and influenced climate policy making by other actors. Kyoto, in short, is a case of institutional design failure, one with lasting and potentially catastrophic impact on the world.

In the next section, I review the literature on institutionalism and regime design, making the case for why climate change itself was a good candidate for international action, noting the potential for regimes to address public good provision and evaluating the environmental justice implications of inaction. The following section turns to the framework of compliance, efficiency, and effectiveness to assess the record on Kyoto, and concludes that this is a case of institutional failure in all three criteria. I then consider the causes of this failure, examining the role played by institutional design features such as time frame, targets, emission measurement, and provisions for future commitments. The final section offers several implications of these findings for policy and theory.

Solving Global Problems: Reviewing the Literature

From both a practical and a theoretical perspective, climate change is a good candidate for international action. Numerous other global issues that require cooperation between states have been successfully addressed at the international level. Cholera, for example, was one of the first transnational concerns to be subjected to coordination efforts by states (Haas 1990). Other public health issues such as smallpox and polio have also been targeted at the international level (Fenner *et al*. 1988; Roberts 2004). Likewise, several prominent arms control treaties aimed at eliminating nuclear proliferation and reducing the number of stockpiled weapons. (Bell *et al*. 2012).[1] The Montreal Protocol on Substances that Deplete the Ozone Layer is one of the biggest success stories, notable for reducing the hole in the so-called "ozone layer" (Benedick 1998). Other issues are primed for the international regime treatment, such as food safety (Lin 2012) and geoengineering (Lloyd and Oppenheimer 2014). Indeed, scholars generally agree that global problems can be addressed effectively through the judicious use of international law and regimes (Allott 2005).

[1]Of course, international-level activity on this issue and others has occurred alongside bilateral agreements and unilateral action.

Climate change is, thus, in good company as an issue to be handled at the international level. Institutional and regime theory also supports this approach. A stable, nonchanging climate can be viewed as a public good (Kaul, Grunberg, and Stern 1999). Although the failure to create the good would be costly for the whole world (Stern 2006), the actual costs of preventing climate change are concentrated among only a few high-level GHG emitters. Many of these states will be tempted to free-ride on the efforts of others, continuing their own emissions while allowing others to bear the costs of creating the public good (Olson 1965).[2] States may attempt to resolve this with bilateral agreements, but the temptation to defect will be high.

International institutions and regimes offer a potential solution to these problems and can promote cooperation among states (Axelrod and Keohane 1985; Keohane 1984; Martin 1992; Oye 1985). They can act as a neutral source of information and monitor and identify free-riders and defectors to other participants, reducing the likelihood of cooperation failure (Abbott and Snidal 1998; Milgrom, North, and Weingast 1990). They can also help reduce uncertainty on state activity (Heazle 2010; Mattli 2001), and develop new rules and norms surrounding management of global commons issues (Ostrom 1990). Participation in a regime can allow states to signal their willingness to cooperate (Morrow 2002), to institutionalize their power on a key issue (Mearsheimer 1995; Strange 1982), or to give politicians the chance to score easy political points (Marcoux 2011). Climate change, therefore, is an entirely appropriate issue to be tackled through international regime building (IPCC 2014; Stern 2006).

But the design of the international regime also clearly matters, both in terms of how that institution functions as well as the outcomes it produces in a given issue area. The rational design of institutions literature focuses extensively on how design affects the function of a given institution and its likelihood of achieving the cooperation promised by regime theory (Hug and Konig 2002; Johnson 2013; Koremenos, Lipson, and Snidal 2001; Thompson 2010). Likewise, there has been an increase in work looking how design decisions affect issue outcomes (Jansen *et al*. 2001; Mitchell 1994). Young (2011) notes that design features can have powerful implications for the success or failure of the regime, where even problems considered difficult to solve can be managed with a well-designed regime. Recent work has focused on the role of design in affecting outcomes in particular issue areas, such as accession to the World Trade Organization (Pelc 2011) or judicial decision making (Alter and Helfer 2010).

Considerations of design are, therefore, crucial in an assessment of Kyoto. But the impact of this key climate institution cannot be confined simply to that of practice and theory. Climate change is an issue that has serious ethical

[2]Indeed, evidence of this can be seen in the burden-sharing agreement within the European Union (EU), where efforts by Germany and the United Kingdom to reduce their emissions by more than 20 percent allow other members, such as Spain, to increase their emissions well beyond their original targets and still be in compliance.

implications if not properly addressed. As Wapner (2014) notes, the failure of climate mitigation efforts will not simply result in a shift to policies focused on adaptation; instead, we should accept that climate suffering is a real possibility. The environmental justice literature would call attention to any issue requiring economically motivated decisions as one likely to harm marginalized communities (Carmin and Agyeman 2010; Iles 2004; Kütting 2004; Martinez-Alier 2002; Pellow 2007). But climate change poses particular threats to such groups (Boyce and Pastor 2013; Jamieson 1996; Paterson 1994). Many of the countries most likely to suffer the effects of climate change are small emitters, and thus have little control over either negotiations or outcomes that will disproportionately affect them (Shue 1992). Ciplet (2014) notes that women and marginalized groups such as waste-pickers have struggled for access, recognition, and representation at climate negotiations. Indigenous groups too have often been ignored in policy-making considerations (Doolittle 2010; Schlosberg and Carruthers 2010; Schroeder 2010). There are also issues of intergenerational justice at stake, as future generations are the ones that will suffer the consequences of decisions made here and now (Barry 1989; Weiss 1989). Finally, these issues have implications that transcend species, as other forms of life and endangered species will be particularly affected by human decisions on climate change, and yet for obvious reasons they cannot advocate on their own behalf (Curlier and Andresen 2002; Fuentes-George 2013).

This discussion leaves us with the understanding that the climate change issue may be a good candidate for an international regime, but the design of that regime is crucial, both in terms of how it engenders cooperation among states as well as its ultimate impact on the world.

A Failed Institution

From both a policy and a scholarly perspective, then, an international institution was a promising forum for addressing a global problem like climate change. The adoption of the Kyoto Protocol was hardly lauded as a panacea to the global climate problem, either at its inception or later (Boyd 2010). At the same time, as the principal international instrument intended to reverse GHG emission trends, it merits particular scrutiny.

With the Intergovernmental Panel on Climate Change (IPCC) now claiming that some climate change is unavoidable and irreversible (IPCC 2014), it is clear that the Kyoto Protocol has failed in its primary mission: to reduce the amount of GHGs entering the atmosphere. In this section, I assess how and in what ways we can consider Kyoto to have failed. I turn to why it failed immediately after.

The following analysis draws on existing approaches to assessing public policies as well as regime effectiveness. The typical approach to evaluating policy success or failure is to focus on considerations of effectiveness, efficiency, and performance (Wallner 2008). Effectiveness and efficiency have long been hallmarks of climate policy analysis: Klein, Schipper, and Dessai (2005) use these

considerations in their discussion of how to build synergies between adaptation and mitigation policy, while den Elzen and de Moor (2002) take this approach in evaluating the ramifications of the Marrakesh Accords. Those working on evaluating regimes focus more readily on assessing regime compliance and effectiveness (Mitchell 2001; Mitchell and Chayes 1995). To keep in line with these established approaches, the analysis follows Blum (2008) and will look at how Kyoto can be judged in terms of its compliance, efficiency, and effectiveness.

Compliance

Compliance—or the extent to which states alter their behavior consistently with the provisions of an institution, is a key consideration in evaluating a regime (Mitchell 2001; Vezirgiannidou 2009; Young 1994). Similarly, performance approaches to policy analysis look at how a policy that had several advantages in terms of timing, windows, and supportive policy entrepreneurs' failures due to poor performance by the actors tasked with implementation (Wallner 2008). The first task in evaluating Kyoto's performance, therefore, is to assess the extent to which states complied with both the letter and spirit of the institution. So, how did Kyoto fare in terms of compliance?

The record is mixed, but overall paints an image of failure. Experts have pointed out that even full participation and compliance with Kyoto would not have prevented widespread climate change (den Elzen and Meinshausen 2005; Wigley 1998). Kyoto required an average GHG emission reduction of 5.2 percent below 1990 levels; however, the 2007 report by the IPCC asserts, "the numerous mitigation measures that have been undertaken by many Parties to the UNFCCC and the entry into force of the Kyoto Protocol in February 2005 . . . are inadequate for reversing overall GHG emission trends" (IPCC 2007). The report from the IPCC (2007) starkly stated what was required:

> To limit the temperature increase to 2°C above pre-industrial levels, developed countries would need to reduce emissions in 2020 by 10-40 percent below 1990 levels and in 2050 by approximately 40-95 percent. Emissions in developing countries would need to deviate below their current path by 2020, and emissions in all countries would need to deviate substantially below their current path by 2050. A temperature goal of less than 2°C requires earlier reductions and greater participation.

These requirements stand in stark contrast to the 8 percent or less reduction that industrialized countries were asked to make.[3] The IPCC 2014 report noted that the trajectory remains bleak: "the current trajectory of global annual and cumulative emissions of GHGs is inconsistent with widely

[3]While the average emission reduction under Kyoto is 5 percent, countries took on differentiated responsibilities, with some countries or regions taking on a greater burden then others. Eight percent is the highest individual target, assigned to then-15 countries of the EU (EU-15).

discussed goals of limiting global warming at 1.5 to 2°C above the preindustrial level" (IPCC 2014, 4). Even perfect compliance with the regime, therefore, would still represent an under-management of the global warming threat.

Despite this low bar, the compliance record is spotty. Canadian carbon dioxide emissions increased by 25 percent from 1990 to 2012 and Japan's emissions increased by 14 percent over the same period (Olivier *et al*. 2013). The success rate improves when we turn our attention to Europe; however, which achieved a 15 percent reduction in emissions from 1990 levels in the EU-15, well beyond the 8 percent target set for that group (European Commission 2013). This success, however, was not universal among the EU-15. The burden-sharing arrangement allowed for expanded efforts in some states to make up for the lack of reductions in others. Therefore, only eight of the 15 countries were reported to have met their individual targets—Finland, France, Germany, Greece, Ireland, Portugal, Sweden, and the United Kingdom. The remaining seven—Austria, Belgium, Denmark, Italy, Luxembourg, the Netherlands, and Spain were not on track to meet their requirements, according to 2013 data (European Commission 2013). Their compliance rested not on their own actions but those of their EU partners.

Further consideration should be given to whether those actors within the regime performed better than those outside it. Strikingly, the country that has been the most reluctant to go along with Kyoto—the United States—boasts (perhaps in spite of itself) widespread and innovative action on climate change at the subnational level (Rabe 2010). Although the United States as a whole has not produced substantial emission reductions—2013 estimates put it at 8.4 percent above 1990 levels—and action has been very limited at the federal level, there is a great deal of state- and city-level activity that in the long-term has the capability of producing strong results.[4] A 2013 report noted, for example, that California was on track to meet its commitment to reduce emissions to 1990 levels by 2020 (Greenblatt 2013). Indeed, the activity at the subnational level across the country has been widespread and innovative (Rabe 2004, 2010). Within the United States there are regional cap-and-trade programs, a sizeable number of the members of the worldwide Cities for Climate Protection Program, carbon taxes, substantial emission reduction targets, incentives and regulations on renewable energy consumption, and increasing automobile emission standards. Several of these programs preceded Kyoto; the others were created despite U.S. nonparticipation in the regime.

Similar situations exist within Canada and Australia, states that at different times also resisted the Kyoto Protocol. Federal systems have a great deal of room for localized policy making, but given the small impact any single state or city can have on global emissions, this activity is still surprising. This is even

[4]For estimates of U.S. GHG emissions, see (EPA 2014). California, one of the more active states on climate change, kept emission levels to a less than 1 percent increase over 1990 levels through 2012, approximately 8 percent less than the nation as a whole over the same period, despite a population growth of 9 percent since 2000 (CALEPA 2013; Choate *et al*. 2002).

more the case when the widespread nature of these activities are taken into account—policy makers have passed climate policies in times of economic hardship, in states that are more traditionally conservative, and in spite of high percentages of the population disbelieving in the very existence of climate changes and the role of humans in causing it (Rosen 2009). Yet these nonmember states boast some highly innovative practices, despite nonparticipation in Kyoto, many of which could lead to significant reductions in the long term (Rabe 2010).

In summary, even though Kyoto set a relatively low threshold for emission reductions, states still struggled to comply. Some, such as Canada, left the regime entirely. Others, like Japan, remained in the regime, but failed to meet their obligations, and have chosen not to participate in the second commitment period. The EU as a whole did manage compliance, but this is due at least in part to the burden-sharing agreement and Clean Development Mechanism (CDM) that allowed many countries to increase their individual gross emissions. Meanwhile, at least one significant nonadopter has seen nascent efforts at emission reductions occur in spite of its nonparticipation in the institution. What this tells us is that compliance with Kyoto is not sufficient to produce emission reductions—but it is also not necessary.

Efficiency

Efficiency has long been a concern in both policy analysis and environmental governance. Shepsle (1997) notes that efficient policies are ones where negative externalities and suboptimal outcomes are limited. In terms of regime assessment, Roch and Perrez (2005) and Vatn (2001) specifically consider the role of efficiency in international environmental governance. One consideration is the level of fragmentation of a regime; that is, the splitting of cooperation in a given issue area over multiple forums, organizations, and institutions (Zürn and Faude 2013). Following Blum (2008), an efficient climate regime would be one where cooperation is sought through a single or small number of institutions as opposed to one that is fragmented into a large number of forums. Given the amount of time and energy that went into creating and implementing the Kyoto Protocol and the resources demanded by the annual Conferences of the Parties, it seems fair to question whether or not the institution is efficient in accomplishing its goals. The short answer is no.

As many scholars have pointed out, in the last decade the climate regime has fractured into a multitude of institutions and forums with overlapping coverage of key climate issues (Karlssson-Vinkhuyzen and McGee 2013; Keohane and Victor 2011; Zelli and van Asselt 2013). Some of these forums include the G8, the United Nations Security Council, the Major Economies Meetings, the now-defunct Asia-Pacific Partnership on Clean Development and Climate, the International Renewable Energy Agency, the Climate and Clean Air Coalition, and many other regional and bilateral efforts (Eckersley 2012; Karlsson-Vinkhuyzen and McGee 2013). New forums and agreements are continually

created, most recently the U.S.-China Climate Change Working Group and their November 2014 announcement of new commitments. In addition, treaties on other issue areas, such as the Montreal Protocol, also play a role in GHG management, while at the local level, transnational coordination and cooperation on climate issues has been on the rise (Betsill and Bulkeley 2004). Scholars point to how forum shifting (Braithwaite and Drahos 2000) and issue linkages (Alter and Meunier 2009) play a role in creating such fragmentation, and the Kyoto regime itself condoned it in 2011, when the Durban Platform moved attention toward creating a new regime even as negotiations continued over a second commitment period under Kyoto. And some even argue that some of these alternative forums—notably the Montreal Protocol—have had more of an impact on climate change than Kyoto itself (Jinnah and Conliffe 2012; Velders *et al*. 2007).

What this points to is an inefficient climate regime complex where the inability of the most prominent institution to address the issue at hand spawns a number of competing, "over-lapping and nonhierarchical" efforts in other platforms (Raustiala and Victor 2004, 279). While some argue that this fragmentation is not necessarily a bad thing (notably, Keohane and Victor 2011), it does represent a flaw in the intention of Kyoto, which was not intended at its creation to be a single institution in an eventual regime complex. As the amount of time, energy, and resources poured into the ongoing negotiations over Kyoto has not decreased over time, this inefficiency poses costs—both real and opportunity—to global efforts at reducing climate change. In this sense too, therefore, Kyoto has failed.

Effectiveness

Of the three considerations for assessing policy and regimes, effectiveness—whether or not the policy or regime worked as intended—has received perhaps the most attention by scholars (Bernauer 1995; Sprinz and Helm 1999; Young 1999; Weiss and Jacobson 1998). This article follows Young (1994) and Andresen and Wettestad (1995), by measuring success or failure in terms of an institution's problem-solving effectiveness. In that vein, our concern should be on whether or not the Kyoto regime solved the problem that concerned its creators: the high rates of GHG emissions into the atmosphere and the resulting likelihood of severe climate change.

Here too, the story is not one to engender hope. Globally, emissions did not decline or stay stagnant compared to the 1990 baseline year; instead, they dramatically increased. In 1990, the global output of carbon dioxide was 22.7 billion tons; in 2008 it was 31.7 billion and in 2013 it was 36 billion (Le Quéré 2014). That represents an increase of 59 percent between 1990 and 2013, and an increase of approximately 14 percent over the course of the first Kyoto commitment period. Prospects for avoiding a 2° temperature increase—considered essential to avoid the worst effects of climate change—are grim (UNEP 2012). In general, the average annual increase of carbon dioxide emissions between

2002 and 2012 was 2.7 percent (Olivier, Janssens-Maenhout, and Peters 2012). As one group put it, there is "virtually no chance to limit global mean temperature increase to below 2°C" (Hohne *et al.* 2010). Granted, much of the increase is due to emissions from countries not bound by the Kyoto Protocol, notably China and the United States, who together are responsible for approximately 40 percent of global carbon dioxide emissions. But this simply raises more questions concerning why policy makers chose to focus their attention for 15 years on an accord with little impact on the key actors.

Among the industrialized Annex B countries that were actually bound by Kyoto, the story is brighter. According to the IPCC 2014 report, these states decreased their emissions in 2008-11 compared to 1990 by 20 percent (IPCC 2014). This would seem to indicate clear success of the treaty. But we should be cautious. Achieving the goals of a treaty does not automatically translate to solving the problem itself (Young 1994). And if those short-term successes create practices that can jeopardize long-term success, then we should hesitate to laud them too highly. This idea is illustrated by an examination of how some of the successful states managed to meet their commitments. Some states adopted questionable policies that met the technical requirements of Kyoto but ultimately did little for or even damaged the underlying effort to mitigate climate change concerns. In other words, they strived to achieve the letter of Kyoto but not its spirit. For example, the EU's ability to meet its target was not due entirely to self-sacrifice, but a combination of massive cuts by Germany and the United Kingdom, the absorption of low-emission territories in Eastern Europe, and the use of the flexible mechanisms within the Protocol. Since Kyoto uses 1990 as the benchmark year for reductions, those states that experienced a decrease in energy consumption and loss of polluting industries following the collapse of communism were more easily able to comply, as their emissions were far below what they were in 1990. The EU benefited from this, as the addition of several Eastern European states into the Union resulted in a windfall in overall emission cuts.

More generally, Kyoto incentivized measures that produce identifiable emission reductions in the short term rather than encouraging the pursuit of more fundamental policy changes and investments that could have produced greater reductions in the long run (Keeler and Thompson 2008). Some states, for example, met their targets by switching from oil and coal to natural gas as an energy source—itself a GHG, although a less aggressive pollutant than traditional fossil fuels. This reduced emission rates in the near term, but still resulted in the emitting of GHGs, and thus will continue to pose challenges in the long term. Other states took advantage of the prices on the carbon market—in some cases, building up production of GHG-producing industries to earn carbon credits for the safe capture of these gases (Noss 2001). In terms of problem-solving effectiveness, Kyoto leaves much to be desired.

Therefore, in terms of the three main determinants of policy and regime success—compliance, efficiency, and effectiveness—the record shows that

Kyoto can clearly be labeled a failure. As Keohane and Victor (2011, 10) put it, Kyoto's "practical effect was narrow, thin and... ultimately symbolic."

A Failed Design

So why did Kyoto fail to make significant strides in solving its global problem? I argue that certain features of the design of the institution contributed extensively to its failure. Certainly other factors—such as strategic interests in negotiating and the complex nature of the climate problem—offer rationales for why Kyoto has failed (Keohane and Victor 2011). In this section, I explore why design failure deserves an equal share of responsibility for these failures.

Design failure means that even perfect compliance by all parties would have failed to meet the objectives of the regime, because the specific structures of the regime itself are unlikely to produce the necessary results. As discussed above, meeting a 5 percent reduction goal by 2012 is little to celebrate when a 50 percent reduction goal is necessary by 2020 (den Elzen, Hof, and Roelfsema 2013). But more importantly, design failure means it is unlikely that the second commitment period, although calling for greater cuts, will be able to achieve the massive reductions necessary to achieve victory in the future. The Kyoto design, quite simply, cannot solve the problem of climate change, and indeed has set back the solution process by decades.

There are four key design features of Kyoto that bear much of the responsibility for the failures discussed above. The first is the time frame of the treaty and the choice to establish a five-year commitment period beginning ten years after its signing. This promoted policies that focused on picking the low-hanging fruit rather than engaging in the fundamental economic and social changes necessary for a sincere effort at halting global climate change. Second, Kyoto called for small, binding, nonprogressive emission reduction targets, which limited incentives for innovation and policy experimentation at a time when best practices for GHG reduction were not established. Third, the choice to measure emission reductions using net emissions rather than gross emissions encouraged states to pass the buck in terms of embracing sincere cuts. Finally, the open-ended scope of the agreement that promised the possibility of future commitment periods exacerbated existing tendencies toward path dependence, meaning that the above design flaws became norms of the wider climate regime, undermining future efforts at correcting them. Let us look at each in more detail.

First, Kyoto provided a very short period for action, encouraging parties to adopt quick-to-achieve policies even if they were not likely to produce lasting or substantial cuts. The commitment period for achieving GHG reductions was 2008-12, beginning just ten short years following the signing of the Protocol. By itself, this brief time horizon would have been enough to limit the options of signatories, but in reality, countries had an even shorter period of time, as the final ratification necessary for the Protocol to move forward came in 2004. The treaty came into force in February of 2005—leaving less than three

years before the start of the commitment period, and seven until the end, with no longer-term goals established.

This time horizon severely limited the policy options available to signatories. Seven years is too short a time frame for some policy options, such as transitioning to non-GHG-producing nuclear energy, as a new plant takes approximately five to seven years to build, not including the planning stages (Nuclear Energy Agency 2012). Likewise, the short deadline limited incentives for serious research and development into other forms of understudied renewable energy such as solar and wind and was not conducive to adopting and implementing new policies of multipurpose land use or building new transportation networks. Instead of encouraging experimentation with rigorous policies, this time horizon created incentives for countries to pick the low-hanging fruit, going for smaller scale policies (such as improving energy efficiency) that could be completed within the time period and potentially achieve the Kyoto target without making serious long-term commitments to addressing climate change (Stern 2006). There was little incentive or benefit to adopting a longer-term strategy (Corfee-Morlot and Höhne 2003).

The second issue compounded these tendencies: the choice of inconsequential, static targets for emission reductions. Developed countries were each given a target for their emissions that averaged out to a global reduction of about 5 percent. Some countries were allowed to increase their emissions under this plan, but most targets ranged between 1 and 8 percent below 1990 levels. The targets have been a frequent target of criticism (Barrett 2003; Bodansky 2007; Victor 2001). The small and static nature of the targets meant that there were no long-term emission reduction goals built into the accord. If the short time frame of the commitment period encouraged states to consider only those policies that could be achieved quickly, the choice of target meant that these policies would not require large-scale changes. Instead of looking for deep cuts or thinking long-term, countries aimed for quick fixes and in some cases, taking advantage of previously passed policies. The United Kingdom and France, for example, benefited from previously passed energy policies that, for reasons other than climate change, phased out fossil fuels in favor of natural gas and nuclear energy, respectively.

A design that privileged short-term, small-scale policies strongly benefited member states, and thus it is easy to understand why countries supported such a design. Domestically and internationally, they could claim to be leading the charge on climate change without having to make massive changes to policy or spending that might have stirred up domestic concern over other countries free-riding on their efforts. And since the time frame was so short, many politicians would still be in office and able to claim credit for their accomplishments. Lacking any kind of proscription for life after 2012, and with the United States not joining the regime, the incentives of member states were clear: do as little as possible to meet the Kyoto target, with little planning for the future.

Germany and the United Kingdom are the obvious exceptions to this mentality, engaging in much deeper policy making on this issue than other states.

But this shows again the flaw in the Kyoto design features: they were able to do this because they adopted more robust targets—21 percent and 12.5 percent, respectively—and had to meet them as part of the burden-sharing agreement with other EU members. Both also pursued progressive targets, establishing goals for 2020 (40 percent reduction for Germany) and 2025 (50 percent for the United Kingdom). Part of the reason they have been successful in achieving their reductions is that they voluntarily adopted higher, more progressive targets and a longer time frame for action. Other successes have arisen in the United States at the subnational level, perhaps in part because these cities and states were free to set their own policies on the issue (Rabe 2010).

The third design flaw resides in how emission reductions are calculated. The choice to evaluate net emissions rather than gross emissions left room for states to avoid deep cuts at home while paying for reductions elsewhere.[5] Under the CDM, for example, Annex I countries could earn credits for their emissions-reduction development projects in other parts of the world. Many states took advantage of this, offsetting growing emissions at home with reduction projects in the developing world. Poor administration of the CDM meant that, according to some estimates, as many as two-thirds of the credits issued were not properly earned (Keohane and Victor 2011; Schneider 2007; Wara 2009; Wara and Victor 2008). In addition, as carbon outputs were assigned to the country that produced GHGs, rather than those that consumed the products they created, countries could shift domestic production overseas, creating a decrease in emissions for accounting purposes but leading to a net global increase in emissions. For example, one study suggested that the U.K.'s 18 percent emission decrease between 1990 and 2008 masked an approximately 20 percent increase when consumption-based emissions are taken into account (Gough *et al*. 2013). These measurement decisions have had profound effects, allowing actors to claim victory when the global reality is one of defeat. More than 15 years later, we are far behind the curve in terms of establishing best practices, with global temperatures still rising.

Finally, we have the provision of multiple commitment periods. As Article 3, Section 9 of the Kyoto Protocol (United Nations 1998) states,

> Commitments for subsequent periods for Parties included in Annex I shall be established in amendments to Annex B to this Protocol, which shall be adopted in accordance with the provisions of Article 21, paragraph 7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall initiate the consideration of such commitments at least seven years before the end of the first commitment period referred to in paragraph 1 above.

[5]The author is grateful to an anonymous reviewer for this point.

Following this, in 2012 a second commitment period was approved via the Doha Amendment. This new phase of Kyoto essentially extends the life of the agreement and all of its attendant design flaws. The only real changes between the first and second periods are the countries given targets, and the overall goal. Thus the flawed features discussed above persist, perpetuating the problems they cause. The focus of emission reductions remained on the short term, calling for an average reduction of 18 percent by 2020, a period of just eight years. The fact that Canada, the United States, Russia, New Zealand, and Japan have refused to join the new period can, therefore, be taken as a sign of either despair or hope.[6]

The issue here is not simply that a failed agreement will receive new life, but that it perpetuates path-dependent structures that have already taken hold. Path dependency is always a concern when assessing regimes as the norms, structures, and processes of an existing regime affect future efforts at addressing a given issue area (North 1991; Page 2006; Pierson 2000). Wendt (2001) discusses how there is a circular loop within a regime between design and designer. While regimes are clearly designed by actors, those actors are themselves influenced by previous design decisions. The possibility of additional commitment periods allows such a loop to continue, with the flawed characteristics of the current treaty continuing to govern future incarnations (Finke 2013). Outside of this particular characteristic; however, path dependence remains a danger. Institutional inertia could result, which would be potentially catastrophic for the climate regime (Munck af Rosenschöld, Rozema, and Frye-Levine 2014). Likewise, Young (2002) argues that it is difficult to eliminate mismatches between regimes and problems. On a more practical level, the new climate agreement to be decided in Paris in 2015 may be susceptible to Kyoto's design flaws. Although offering a potential way to break free of the Kyoto structure, the designers of this new accord, to use Wendt's language, are in many cases the same as those participating in the negotiations in the Kyoto regime. Regime perpetuation, embedded in the design of Kyoto itself, is thus very likely, even as regime fragmentation continues (Keohane and Victor 2011; Young 1999).

Taken together, these four design features essentially created perverse incentives that have derailed efforts at addressing climate change. Focused on meeting Kyoto's minimal goals, policy makers lost sight of the true goal: halting climate change. And this occurred at a crucial moment in time, when concern on climate change was rising and international actors were taking the threat seriously. This was the time to begin experimenting with policies and pinpoint best practices. Instead, it created opportunities for companies to emit more GHGs and seek profit on the carbon market. The annual meetings of the Conference of the Parties work from the Protocol as a framework, and what may have once been

[6]The Durban platform does provide for a pathway for non-Kyoto system of addressing climate change. Due to be considered for adoption in 2015, it is too early to see if its design will improve on the Kyoto model. Regardless even a perfectly designed agreement with high compliance rates would have to make up for almost 20 years of lost time.

meant as a "stop-gap" measure will, thanks to the Doha Amendment, last until 2020. The opportunity costs, therefore, continue to mount: by focusing on the short term for the last 15 years, we have lost out on 15 years of large scale changes in land, transportation, and energy use as well as the innovation and experimentation that should have been going on during that time. Instead we have perverse policies that take advantage of loopholes in the agreement and as a result the world is not much better off than it was in 1997. It is the lost opportunities that we should mourn, while guarding against the continuation of the very agreement that perpetuate the losses.

Conclusion

I have argued that Kyoto is a case of institutional design failure, and one that has consequences far beyond simply contributing to our collective knowledge based on what makes regimes succeed or fail. Climate change is a global problem with massive implications if left unchecked—and we are running out of time to put workable solutions in place. Indeed, experts are already claiming that some level of climate change is unavoidable, and that our focus should shift to avoiding worst-case scenarios (IPCC 2014).

Kyoto's failure, therefore, is a true liability, because it has cost the global community something that cannot be replaced: time. By adopting a flawed institution that lends itself to path dependence, experts have missed out on promoting alternative methods that could potentially have performed better. For example, Victor and Salt (1995) recommended a system of soft commitments for states that could have initiated a commitment process while international actors created more effective monitoring and enforcement systems. Keohane and Victor (2011) note that a comprehensive institution covering all of the issue areas in the current climate regime complex would have been unlikely to gain traction in 1997—but there could have been the intentional creation of a flexible regime complex that recognized the potential for the diversity of problems and issue areas that climate change posed. A third option would have been to focus on binding policies and measures, rather than the binding targets adopted in Kyoto, which might have led to increased participation in a different regime (Vezirgiannidou 2009). Finally, we could have adopted a structure promoting a bottom-up approach that allowed for policy innovation and experimentation among state, substate, and nonstate actors, with space to recognize and diffuse best practices (Bodansky 2007; Rayner 2010). Such an approach may have been particular suited to a problem that needs to be resolved in a shorter time frame (Lloyd and Oppenheimer 2014).

It is beyond the scope of this article to assess whether these solutions would have had higher rates of compliance, efficiency, and effectiveness than the Kyoto Protocol, although that is a potential avenue for future research. What can be said here is that while many of these alternatives were not raised until ten or 15 years after the creation of Kyoto, this shows precisely the

point: rather than recognizing the early stage we were at in regard to recognizing best practices, and creating a system that would have encouraged policy innovation, we created a limited institution that promoted short-sighted policies that, due to path dependence, have legs. Alternatives are difficult to cultivate effectively in such an environment, and should make up for lost time—something becoming infinitely more precious as the latest dire reports on climate come through.

Where does this leave us in terms of future cooperation on climate change? First, policy makers and experts should explicitly acknowledge the failures of the Kyoto design, reconsidering how they evaluate "success" on the climate issue. The use of percentage-based, net emissions targets, for example, is suspect. Policy makers are already recognizing the importance of long-term goals: the EU, for example, has combined its shorter-term obligations for 2020 with those aimed at 2050. Given the limited success of the flexible mechanisms of the Kyoto regime, systems such as the CDM and emissions trading should be reevaluated in terms of their ability to produce sincere emission reductions, rather than just the differentiated appearance of them. Attention should also be given to identifying best practices among policies at the national and subnational level and encouraging diffusion, where appropriate. Ultimately, however, our ability to mitigate climate change is now limited, and the Kyoto Protocol bears some responsibility for this by sending us down the wrong path and promoting policies that incentivized short-term and self-serving behavior among states. Our best strategy now may be to divert our attention more to adapting to the climate change to come and to minimize the damage and suffering to marginalized, disenfranchised, and particularly susceptible groups.

This does not mean that the Kyoto Protocol is entirely without merit. Indeed, its most significant impacts occurred in spite of its design. It initiated the inclusion of climate change on the agendas of governments around the globe. Its design features too are not objectively bad. Short time lines, binding targets, and the option for future commitment periods are all mechanics that could work well on a different issue. They also could have worked as part of an institution on climate change. If, for example, policy experimentation had already occurred, and best practices identified, a short time frame for action might have been viable. In another time or place, Kyoto could have had the potential to be the "right" solution.

Timing, then, is crucial to the climate story. Regimes can founder or fail, and the world can go on—either with the problem going unsolved, or with new regimes taking their place. But with climate change, there is a real time limit on action. Attention is already turning away from mitigation efforts to adapting to the effects—and potential human suffering—coming from climate change (Wapner 2014). Experts warn that avoiding a 2° rise in average global temperatures may be unavoidable and that the world is on track for a 4° rise, which would lead to catastrophic changes in ecosystems (Rogelj 2012; World Bank

2012). We should, therefore, acknowledge a sad truth: we may have missed our window to solve this problem.

The year 1997 was a time to create sound processes that would have allowed flexibility for new actors, ideas, and linkages in the climate space. Such processes would have had more value than the specific requirements of signatories (Desai 2010). The "theory of the second best" would suggest that we should not have proceeded with a regime as flawed as Kyoto (Goodin 1995; Wendt 2001). Indeed, what the Kyoto experience teaches us is that the wrong international agreement can undermine the entire effort to solve a global problem—even it comes at the right time.

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