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Climate Change Politics in North America: The State of Play

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Editors

THIS REPORT CONTAINS PAPERS from a two-day conference on *Climate Change Politics in North America*, organized at the Woodrow Wilson International Center for Scholars, May 18-19, 2006. The conference papers and participants endeavored to critically examine key aspects and issues of North American politics and policymaking related to climate change.

In 1992, 172 of the world's governments gathered at the Earth Summit in Rio de Janeiro, Brazil. There they adopted the United Nations Framework Convention on Climate Change, which set the goal of the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." Five years later, in 1997, the much-debated Kyoto Protocol was negotiated among national representatives from around the world, setting mandatory greenhouse gas (GHG) emission reductions for industrialized countries and countries with economies in transition, but not for developing countries. The Kyoto Protocol entered into force in 2005, and countries with emission reduction requirements that have ratified the agreement are required to reach their targets no later than 2012. By mid 2006, 164 countries had ratified the agreement. Currently, climate change related policy initiatives are developing in many countries based on an acceptance of the science demonstrating important changes to the global climate system and a warming trend largely caused by human release of GHG emissions (Fisher, 2004; Harrison, 2004; Schreurs, 2002; Weart, 2003; Houghton, et al., 2001).

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CLIMATE CHANGE POLITICS IN NORTH AMERICA

HENRIK SELIN AND STACY D. VANDEVEER
Editors

In recent years, climate change politics and policymaking have expanded and grown increasingly multifaceted in North America. Of the three North American countries, Canada and Mexico have ratified the Kyoto Protocol, while the United States has elected to stay outside the agreement. Under the Kyoto Protocol, Canada has taken on a legally binding emission reduction commitment of six percent below its 1990 emission levels. Mexico, classified as a developing country, is not required to reduce its GHG emissions under the Protocol. Partially as a result of different attitudes toward the Kyoto Protocol, Canada, the United States and Mexico have developed different federal climate change policies. In addition, the complexities and divergences of climate change policies in North America are even greater at the sub-national level than among the federal governments, as climate change policy initiatives are discussed and developed in a multitude of firms, municipalities, states, and provinces.

Canadian public support for the Kyoto Protocol and Canadian ratification of the agreement is widely known. Only recently have Canadian government officials acknowledged that Canada is unlikely to meet its Kyoto commitments (Stoett, this volume). Opposition by the Bush administration and many members of the U.S. Congress to the Kyoto Protocol and to mandatory federal standards on GHG emission reductions is also well documented and much debated. Less well known, however, is that a growing number of U.S. states, Canadian provinces, and municipalities across North America are adopting climate change policies that exceed national standards and goals. Likewise, a growing number of large North American-based private sector entities have launched GHG reduction efforts, often going beyond federal mandates.

> "Most action at the forefront of climate change mitigation in North America is developing outside the realm of the federal governments.

Much (if not most) action at the forefront of climate change mitigation in North America is developing outside the realm of the federal governments in Ottawa, Washington, and Mexico City. Firms, non-governmental organizations, municipalities, states and provinces are all playing critical roles in North American climate politics. In this respect, North American climate change politics and ongoing efforts to curb GHG emissions are largely driven "from below."

This collection of papers analyzes issues critical to our understanding of the politics and developing policymaking on climate change in North America. Many of these initiatives are influenced by Kyoto Protocol debates, while others seek to get "beyond Kyoto." Rather than focusing on actions or inactions of the three federal governments, the papers examine a multitude of policy developments at international, national, regional, and local governance levels in the public sector, in the private sector, and in civil society.

THE PAPERS

Peter Stoett's paper examines climate change politics and policymaking in Canada with a specific focus on challenges faced by the new Conservative government elected in 2005. Barry Rabe's piece details the rapidly expanding policymaking efforts related to climate change in many U.S. states that are developing in response to various environmental, economic, and energy concerns among state officials and publics, as well as the policy vacuum created by a generally inactive U.S. federal government. The paper by Henrik Selin and Stacy VanDeveer builds on Rabe's analysis of the importance of state-level action and examines significant policy making initiatives in Northeast North America in more detail.

Ian Rowlands' paper analyzes issues associated with renewable energy production, trade and use in a Canadian-U.S. context. Simone Pulver examines climate change and energy issues in Mexico, with a particular focus on the role of PEMEX, the Mexican state-owned oil company. Michele Betsill scrutinizes the possible creation of a GHG trading mechanism under the North American Free Trade Agreement. David Levy and Charles Jones analyze reactions and strategies of private sector

mate change issue and expanding climate policy. Virginia Haufler's paper also looks at the private sector but more specifically focuses on the insurance and re-insurance sector. In the final two contributions, Dovev Levine details the expansion of climate change action on university campuses, and Susanne Moser discusses the role of communication in motivating citizen action and support for more aggressive climate change policy.

WHO CARES?

Addressing the challenges posed by human-induced climate change is seen by many policy advocates as a long-term process of multi-level and multi-sector governance. The issues examined in these papers are important for North American citizens and policymakers, and for many around the globe interested in long-term solutions to global climate change. If GHG emissions are to be reduced to levels needed to stabilize carbon dioxide concentrations in the atmosphere, then numerous changes in policy and behavior from the global to the local levels will be required around the world. North America is a major emitter of GHG emissions in both absolute and per capita terms, and bringing these emissions down will be necessary to tackle global emissions. Thus, policymakers, analysts, and advocates everywhere would do well to pay attention to the plethora of efforts associated with climate change mitigation across North America, and critically assess the potential and limitations of these efforts.

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The papers collected here illustrate that much more is happening on climate change mitigation in North America than may be apparent at first glance. A growing number of public- and private-sector actors in North America are preparing for a future where the costs of carbon emissions (and the activities that produce them) will increase and where policies will be aimed at limiting GHG emissions. At the same time, only minimal environmental progress can be noted so far. Total carbon dioxide emissions are much higher today in all three North American countries than they were in 1990 or 2000. Yet, a foundation for more active and ambitious climate change action in North America appears to be emerging. If public and political support for more proactive action across public and private sectors continues to grow, this could facilitate much more rapid climate change policy developments in North America over the next five to ten years.

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Canada, Kyoto, and the Conservatives: Thinking/Moving Ahead

PETER STOETT[1]

CANADIAN CLIMATE CHANGE POLICY

In 1987 Canadian Prime Minister Brian Mulroney, during a multilateral conference in Toronto, called the threat from climate change "second only to a global nuclear war," and called for 20 percent cuts in greenhouse gas (GHG) emissions by 2005. Thus would begin a fairly consistent pattern of rhetoric outweighing policy implementation on this issue. Canada had promised to stabilize GHGs at 1990 levels prior to the 1992 United Nations Conference on Environment and Development (UNCED), at which the embryonic, but target-less, UN Framework on Climate Change (UNFCC) was signed. The subsequent Liberal government went further, promising a 20 percent reduction and introducing the first National Action Program on Climate Change. As it became apparent this was rather unrealistic, the target slipped at the Kyoto negotiations in 1997 to six percent below 1990 levels by the five-year commitment period of 2008 to 2012. Though Canada signed the Kyoto Protocol on April 29, 1998, it did not ratify the agreement until December 17, 2002.

Actual policy initiatives on emissions reduction have been slow in coming, but many environmentalists were somewhat heartened by the steps later taken by the Liberal governments of Jean Chrétien and Paul Martin. These included the Action Plan 2000 on Climate Change which committed $500 million to the effort; and, in November of 2000, the release of the Climate Change Plan for Canada, promising (but falling far from delivering) annual cuts of 240 megatonnes of emissions. Total spending on Kyoto neared $4 billion by 2003. In 2004 the One Tonne Challenge was released; it sought voluntary efforts by citizens to reduce their own emissions but came with energy conservation initiatives and other incentives. Later the same year, Environment Canada released its 2002 greenhouse gas inventory, indicating that Canada had emitted 731 megatonnes of greenhouse gases that year, up 2.1 percent over 2001, and 28 percent above the Kyoto target of 572 megatonnes it had promised to reach by 2012. In March of 2005 the federal government reached an agreement with Canadian automakers that contained voluntary commitments to GHG reductions. Later that year a plan was released which both increased government spending and decreased the obligation of large emitters to reduce emissions. The Province of Alberta made it very clear it had no intention of enforcing Kyoto provisions in its jurisdiction, and proceeded to intensify the highly polluting process of extracting oil from tar sands.[2] Indeed, provincial disharmony has been a constant factor in Canadian climate change policy, since the provinces are constitutionally responsible for the governance of natural resources (though the federal government retains much room for jurisdiction on pollution issues), and since the provinces differ in terms of their resource and energy production bases.

Canada's Kyoto commitments demanded total national emissions of 571 megatonnes (Mt) per year during the period of 2008-2012. With current emissions well over 725 Mt, reaching this target would

indeed be a colossal achievement within the time span permitted. More "action plan" than action, Canada's national efforts fell so far from the mark that the Liberal government's steadfast public commitment to Kyoto became difficult to take seriously by late 2005. In January of 2006, Stephen Harper's Conservative party won a minority government, and with it came a shift from a Kyoto-oriented policy platform to an essentially anti-Kyoto platform. This brief paper discusses related contextual and implicational issues.

NEW DIRECTIONS?

It would be premature to declare the Canadian implementation of Kyoto dead, but it is certainly apparent that the new Harper government is making audible funeral arrangements. Indeed, it has moved with rather remarkable speed toward dismantling whatever scaffolding previous Liberal governments had managed in their own procrastinate manner to erect. Public comments by Environment Minister Rona Ambrose and Natural Resources Minister Gary Lunn have made it clear that "less Kyoto, more Washington," is the preferred approach. A "made in Canada solution" has emerged as the mantra for the development of a new set of policies, which includes an overhaul of the Canadian Environmental Protection Act (CEPA) and a focus on air and Great Lakes pollution; some critics are already labeling it a "made in Washington" approach.[3] This is unfair, but it is clear that a Canadian approach as conceived by the Harper government differs significantly from the seemingly false promises made by the Chrétien and Martin governments, and that the current government will be even less willing to direct onerous responsibilities toward the large final emitters (LFEs) that contribute just under half of all Canadian emissions.[4] Cuts have included the much-publicized One Tonne Challenge, 40 public information offices across the country, several scientific and research programs on climate change, and a home conservation rebate plan.

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Of course, the death of Kyoto has long been predicted by many observers, especially once George W. Bush and his team assumed the helm in Washington (see Soroos, 2001). Kyoto has several embedded problems that suggest a premature demise, such as the lack of participation by key states with rapidly expanding economies, a lack of U.S. leadership, and a reliance on market mechanisms to control emissions with insufficient infrastructure to avoid corruption. It has certainly been common knowledge that, without a Herculean effort and the complete participation of every provincial and municipal government, Canada's commitment of six percent below 1990 levels will be an embarrassing failure; even Liberal officials said as much prior to ratification.[5] Even if we assume a genuine (if incontestably delayed) effort on the part of the Liberals, an expanding economy and population have put the initial commitment out of reach.[6] The Harper government has argued that it faces the stark choice of admitting defeat in terms of the specific goals, or of pretending Canada can meet the targets and facing certain embarrassment at a later date. In this context they should at least be commended for an honest assessment and statement of their capabilities, even if their intentions remain rather unclear at the time of this writing (May 2006).

While Canadian officials insist that Canada maintains a long-term commitment to Kyoto, and indeed Ambrose (because of a prior Liberal commitment)

recently presided over the 24th session of the Subsidiary Body for Scientific and Technological Advice (SBTA) and the Subsidiary Body for Implementation (SBI) of the UNFCCC in Bonn, it is self-evident that efforts to curb expectations of further Canadian commitments have already been made. Cutbacks to Kyoto-inspired Liberal programs have proceeded at breakneck speed, ostensibly to make budgetary room for a tax subsidy for citizens willing to take public transit on a regular basis. Nearly every statement from Ambrose and Lunn about Kyoto has at least mentioned the sheer futility, and implied folly, of trying to meet the original goals.

This does not amount to abandoning Kyoto, but to demanding a renegotiation of a commitment that was, according to the new regime, made under false pretenses in the first place. Should the effort to re-open commitments fail, which it probably will, Canada has another option, which is simply to fail to meet the targets, and then get serious about a renegotiated post-2012 scenario. The more drastic option of pulling out of the Protocol, which could be done legally in a matter of two or three years, seems less likely at this point, when the Conservatives hold a minority in Parliament. Indeed, some of the policy advisors I approached insisted that even with a majority government there is no long-term plan to pull out of Kyoto, though that will be proven in time. At present, however, public discourse over Kyoto seems hampered by the emergence of bipolarity on Kyoto, ranging from near-religious support to outright dismissal. This is unfortunate. Indeed, one could argue that ideological blinkers have been limiting the policy spectrum for some time. Given the realities of petroleum-friendly governments in both Washington and Ottawa, some ideas are best discarded, if only for a better view of the policy option landscape.

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LEADERSHIP QUESTIONS AND QUESTIONABLE LEADERSHIP

Many casual observers have been hampered by the erroneous belief that federal or national leadership is just a matter of time on climate issues. The belief here is that visible extreme weather events will force politicians to lead. Yet political logic suggests that politicians will not cut off the main branches on which they sit; in the Conservatives' case, this includes the oil wealth and tar sands development in Alberta and an ideological platform encouraging deregulation. Some might argue that the Harper government, with its clearly right-leaning platform, is the only party that can actually apply serious pressure to LFEs, since the latter will have no "further-right" party to support in retaliation. I find this somewhat fanciful, but perhaps this will play out over the next year.[7] Short-term and relatively minor infusions of cash into research and development aside, we will not see major leadership initiatives by either Ottawa or Washington on climate change. In the Canadian case, even in a minority government where the opposition is in favor of Kyoto, this is already evident. I am tempted to view the lack of serious leadership at the national level as a permanent feature that will outlive the next national elections in both Canada and the United States. In short, the lack of national leadership on climate change issues is a safe assumption we can make when looking forward.

Given the leadership lacuna at the national level, a decentralized vision of strategy has begun to emerge. This remains one of the most sensitive political issues in a federalist state. For example, if much of the action on climate change will take place at the city level, the federal government needs to find innovative ways to support local initiatives without soliciting provincial territorialism. This is easier said than done. Nonetheless it is evident that mayoral leadership in the United States is impressive: some 231 mayors representing

more than 45 million Americans have signed the U.S. Mayors Climate Protection Agreement; 20 Canadian counties, towns, and cities (including Calgary and Edmonton) belong to the International Council for Local Environmental Initiatives. Transgovernmental approaches will similarly hold greater promise than multilateral ones at this stage. For example, in 2001 the New England Governors and Eastern Canadian Premiers adopted a joint Climate Change Action Plan, committing to reduce GHG emission to 1990 levels by 2010, and 10 percent below 1990 levels by 2020 (see Selin and VanDeveer, 2006). This commitment was renewed as recently as May 2006. It is time to recognize that most leadership on this issue is not national but regional and municipal. Canadians would be foolish to rely upon the inevitability of national leadership. Nonetheless, if the latter is to proceed, it will be within the realm of consultative relations with the provinces.

THE NEED FOR FEDERAL-PROVINCIAL CO-ORDINATION

The lead-in to Kyoto is often referred to as a textbook example of how *not* to conduct the complex interplay between foreign affairs commitments and federal-provincial relations. Arguably, it was a squandered opportunity for serious cooperation. There are of course several interpretations of this, with some suggesting the provinces' recalcitrance as the main culprit and others insisting Ottawa made all the wrong moves in its lackluster effort to achieve provincial harmony. From an outsiders' viewpoint, it is rather obvious that both the federal government and several provincial governments are to blame for the essential disconnect. The 1995 National Action Program on Climate Change, resulting from federal-provincial ministerial dialogue, did nothing to decrease emissions, which were almost 10 percent above 1990 levels in 1999. A 1997 agreement, *sans* Quebec, to stabilize emissions by 2010 had some promise, but the federal government unilaterally declared its intention to agree to a three percent reduction instead of stabilization at Kyoto. Once there, it went a step further, effectively doubling that commitment to six percent. No doubt this description misses much of the nuance behind the process, but it remains an event that most provincial historians note as a federal betrayal (MacDonald and Smith, 2000).

As always, relations between Canada and the United States and their public optics are interesting facets of the story. Much of the Canadian federal oscillation prior to and during the Third Conference of the Parties (COP3) to the UN Framework Agreement on Climate Change seemed to be predicated on shifts within the Clinton administration. Likewise, Harper will be sensitive to the popular suspicion that his approach is based largely on the Bush/Cheney approach to energy policy. Also constant are concerns that a majority government will be impossible to achieve if the rest of Canada perceives the government as excessively Albertan. But open consultation and, on some key issues, negotiation with the provinces will be as essential as it will be strained. The recent rapprochement between Ottawa and Quebec (the federal government has made several initiatives to court the favor of Québécois concerned with their cultural identity) will be put to an interesting test in this regard; Quebec's moral high ground on this issue (afforded by its immense hydropower development) is particularly irksome to westerners.

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There is more than mere political territoriality involved here. When it comes to GHG reductions, common terminology may be found, but common understandings will be a much more painful and

localized process. For example, Manitoba has claimed it is well on the path to exceed Kyoto commitments, but there remains ample controversy over the exact level of GHG contributions made by hydropower. Indeed, it is often simply assumed that we have commonly agreed-upon methodologies for measuring emissions, and even this is false (especially on a global scale, but across a large state such as Canada as well). Similarly, debates over carbon sequestration sinks leave much room for both innovation and compromise. Canada should push its expertise in this vital scientific field, through the SBTA and through the promotion of educational development in Canadian universities. Technological solutions will never, in themselves, provide sustainable development, but they can certainly point towards sustainability. However, provincial interests will almost certainly distort their utility.

One ray of hope here is that a national emissions cap and trading regime can be established that will unite provincial jurisdictions. This should be taken cautiously, however. Doubtlessly, the promise of a robust international emissions trading regime has generated an entirely new field of economics, based almost entirely on derivatives and futures. The idea is borrowed from U.S. efforts to cap air pollution, but in its Kyoto variation it has spawned a virtual feeding frenzy of potential investors, chartered accountants, financial advisers, and lawyers. It has, in short, already taken off at astronomical speed toward becoming a major industry in itself—if it ever actually works, outside of a domestic or European Union context. However, it would be imprudent to put too much stock in carbon emissions trading as either a profitable activity or a sincere effort to reduce global warming. This was a market-based incentive compromise[8] (Cass, 2005) that is often lambasted by the right (who feel it gives undue credit to overpopulated developing states and de-industrialized Cold War losers) and the left (who view this as yet another way to escape the demands of emissions reductions at home and carry on business as usual). Even possible Clean Development Mechanism (CDM) contributions have raised serious concerns amongst environmentalists that the CDM could be used to "avoid Kyoto action" while contributing to projects in the southern hemisphere with dubious ecological (i.e., in terms of forest carbon sinks) and human rights implications, such as the Plantar eucalyptus tree plantation in Brazil.[9]

Meanwhile at the national level, Canada is far from implementing an effective trading system. Beyond Alberta's media campaigning and Ontario's hesitance, Quebec's insistence that it be rewarded for hydro resources has also curtailed any effort to establish a national emissions trading regime. One thing is certain: the Harper government will not indulge the end-result of the multilateral trading system as agreed to, *sans* the United States, which would see companies and/or provinces and/or the federal government buy "hot air" credits from de-industrialized states such as Russia. This should not be difficult policy to sell. Hopefully the Harper government will move toward a national system, but this will require compromise and commitments by provincial governments.

Ultimately, it is senseless to prolong the debate over the most appropriate political level of environmental governance in Canada. It is quite clear that all levels are heavily involved and none has sufficient leadership capacity to firmly take the helm. Local initiatives, which are flourishing, offer the best hope for an effective GHG reduction program. Ronnie Lipshultz offered five essential arguments in favor of local approaches that focus on the bioregional level of implementation. They allow for the scale and practices of ecosystems; more effectively assign property rights to local users of resources; locate local and indigenous knowledge; increase participation of stakeholders; and display greater sensitivity to feedback (Lipshultz, 1994). But there is no doubt that some form of national or federal level leadership is instrumental, since "pollution lies substantially within federal jurisdiction. Pollution and the protection of habitat are very much a part of providing peace, order, and good government" (Paehlke, 2001). Edward Parson concluded a major research project on environmental governance with the thought that "[a] promising direction for resolving competing claims of environmental authority at multiple scales would be to construct cross-scale networks of shared authority and negotiated joint decisions that mirror the complex cross-scale structure of environmental issues. Canada's loose federal structure may facilitate such an approach, or indeed compel it if redrawing the lines of formal environmental authority is out of the questions" (Parson, 2001). He adds that the Canadian Council of Ministers of the Environment held such promise in the 1980s and early 1990s, as it "helped build technical capacity in smaller jurisdictions; it invested provincial and territorial officials with a national perspective when they held the rotating chair; and it provided key research and analysis

to address technically challenging problems shared by multiple jurisdictions" (ibid.).

Though it still meets today, this Council could certainly be rejuvenated with political will. This entails federal, provincial, municipal, and aboriginal participation, and in the case of an issue so obviously global in scope, the participation of the foreign policy community is essential as well; in total this has been referred to as the "microfederalism of environmental policy" (Gillroy, 1999). Given the lack of national leadership, this is not necessarily a bad thing; some combination of unwieldiness and pragmatic co-operation is the hallmark of democracy, and few of us are convinced of the need for radical centralization at this stage. Public opinion is fairly strong on this issue, and non-governmental organizations can keep genuine pressure on politicians at the federal, provincial, and municipal levels to engage in serious discussions. It is perhaps shameful that Canada needs to reinvent this process at this late stage; yet the alternative at the governmental level is doing nothing.

LOOKING FURTHER AHEAD

We need to start talking openly about adaptation to climate change, a topic the Inuit will no doubt become very familiar with as their way of life is further altered by climate shifts. Several scholars have been doing this for some time (see Pielke, 1998), as have the UNFCCC COPs, but generally it has been taboo amongst environmentalists to seriously discuss adaptation, since it implies resignation to the fate of global warming and might discourage more active prevention programs. The norm of stopping global warming is pitted against the relatively mild, even acquiescent need to limit human damage, and naturally the former appears more robust.[10] However, given the serial lack of leadership on this issue, the immensity of the problems associated with mitigation, and the continued drive for industrialization, it is only reasonable to assume adaptation will become one of the more pressing policy concerns we will face in coming decades (I will return to this theme below). More importantly, however, openly discussing adaptation—most notably in Canada's case, possible policy responses to northern challenges, and the subsequent demands this will place on future budget projections—will frame the issue as a mainstream concern, and provoke more reasonable demands on the Conservative government to begin thinking aloud. Finally, admitting that adaptation is both necessary and inevitable confirms the science behind climate change. It would seem that Canadians face a much thinner wall of disconnect in that area than do Americans at this stage, though this is changing as public awareness in the United States increases and even some of the largest fossil fuel companies publicize their efforts to combat global warming.

Again, the Canadian north will face serious adaptation policy issues. Rather quickly, the Arctic has become what is perhaps the most visible related issue-area for Canadians; this was reinforced by a recent *TIME* magazine cover depicting a lonesome and, perhaps, doomed polar bear. Recent studies indicate that Arctic ecosystems are in peril, and that is a disturbing scenario not just for northerners but for the image of Canada as a whole. A recently completed Arctic climate impact assessment concluded that air temperatures in Alaska and western Canada have increased as much as three to four degrees Celsius in the past 50 years, leading to an estimated eight percent increase of precipitation across the Arctic; when this falls as rain it increases snow melting and the danger of flash flooding. Melting glaciers, reduction in the thickness of sea ice, and thawing of permafrost are also possibilities. "Should the Arctic Ocean become ice-free in summer, it is likely that polar bears and other northern species would be driven toward extinction" (Canada, 2005). Arctic disturbance has also raised various security dimensions. This will be a convergence point of publicity efforts made by opponents and proponents of Kyoto. Oil and gas companies (Canadian and Alaskan) will strive to demonstrate their ecological consciousness by way of tender television commercials; environmental NGOs will use the Artic as a platform to raise broader awareness of their concerns; the military will request additional funding for proper ice-free surveillance. What might get lost in all this, however, is the actual condition and effects of global warming upon northern peoples. Here we have both a constituency, albeit a small one, and a global human rights concern that could prove to be a great embarrassment for an ostensibly progressive state such as Canada.

I would suggest also that Canada is not doing enough to sell renewable energy abroad, despite the economic opportunities this entails. Though undoubtedly improving, Canadian commitment to solar power, wind power,

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geothermal activities, and hydrogen fuel cell development has been limited. While wind technologies are beginning to penetrate utility markets and catch the eye of domestic policymakers, and companies such as Ballard have emerged as world leaders in the development and employment of fuel cell technologies, the Canadian International Development Agency (CIDA) remains actively engaged in developing the oil and gas sector abroad, from Bolivia to Kazakhstan.[11]

Given the immense potential for solar power and biomass development in Africa and elsewhere, it might be wise at this juncture to investigate more seriously the option of redirecting resources into these emerging fields. The assumption that developing states must pass through a fossil-fuel dependent stage in their paths toward "modernity" discourages more creative efforts to facilitate development. Given the potential contribution Canada can make with technology transfers, and the fact that any global agreement based on emissions reductions will indeed prove futile in the face of expanding industrialization in Asia and Latin America, it would appear obvious that Canadians can best pursue their long-term interests by encouraging states to either limit or rapidly bypass the oil-based technological culture that characterized North American and European development.

Meanwhile, the symbioses between globalization and global warming are increasing the likelihood of bio-invasions at both the microbial and species levels, causing shifts in pathogenic virulence (Price-Smith, 2002). There is evidence that warming trends will induce species migration northward, and this raises concerns about disease and threats to native species (see Hughes, 2000). However, such "unassisted migration" will prove difficult for rare species of plants and trees, and adaptation or extinction is as likely (see Iverson, et. al., 2004). Not so for insects: warming patterns have vastly extended the range of the mountain pine beetle, ravaging Yoho National Park in British Columbia and threatening forests in the State of Washington; officials in Alberta are "setting fires and traps and felling thousands of trees in an attempt to keep the beetle at bay."[12] (One former government official involved in the negotiations over softwood lumber tariffs mentioned the possibility that the agreement reached in 2006, which was certainly not in tune with the Canadian government's initial demands, was provoked at least partly by the pine beetle—or, rather, the urgent need to clear forests and, as a result, the need to resume large-scale exports.) In the infamous case of zebra mussels, which have clogged entire swaths of the Great Lakes, we might see northward migration as appropriate reproduction temperatures are more common. Flooding could expand zebra mussel territory even further. It is believed that "…climate change will affect the incidence of episodic recruitment events of invasive species, by altering the frequency, intensity, and duration of flooding … by allowing aggressive species to escape from local, constrained refugia." (Sutherst, 2000; Kolar and Lodge, 2000). In general, we may be in for some nasty surprises, but this uncertainty is also an opportunity to promote the cause for climate change policy as well, directly appealing to threats-to-livelihood issues on which various levels of governance should be compelled to act.

CONCLUSION

I have only touched on the range of actors necessary for a serious, post-Kyoto Canadian effort to combat global warming to take shape. It is certainly necessary to involve the business community and the NGO community (neither of which often appreciate the finer qualities of the other) as well as aboriginal groups. Indeed, these sectors will involve themselves without invitation through courting public opinion. The big question may well be whether the Conservative government has either the legitimacy or instinctive openness (beyond repeated bromides to the values of decentralization) to pursue such a broad agenda when it is related to a topic they do not find particularly galvanizing in the first place. Meanwhile, the Kyoto machine chugs on,

with hundreds of government employees carrying on as though the Kyoto protocol is an assumed contextual variable in international affairs; busy with COP preparations, and sub-COP preparations, and the Ad Hoc Working Group for Further Commitments for Annex 1 Parties Under the Kyoto Protocol preparations, and the intricacies of providing security for participants at COP12/MOP2 in Nairobi next year, and the many other facets and minutiae of these global governance efforts. They are joined by citizens who have adapted a Kyoto-based litmus test for environmental concern, and still await national leadership to get us there. It may be time to look elsewhere for both leadership and co-operative possibilities; indeed this is happening with unprecedented frequency at the level of civil society and even, to a limited extent, in the private sector.

Thankfully, we have more than Kyoto with which to approach global warming, both in terms of mitigation and adaptation. Trans-governmental and community-level programs can both set regulatory examples and reduce emissions. Internationally, there are extant technology agreements such as the Carbon Sequestration Leadership Forum, Methane to Markets, the Renewable Energy and Energy Efficiency Partnership, and the Asia-Pacific Partnership on Clean Development and Climate.[13] There are also many other international agreements that have a direct or indirect impact on shaping climate change related policies, and we would be remiss to mourn the failure of Kyoto without some optimistic referral to the opportunities they offer. Indeed it would take a very long policy paper to outline them all; Meinhard Doelle has listed several in a recently published book on climate change and international law, including world trade, human rights, law of the sea, and biodiversity conservation (2006). In some cases, there is a blatant advocacy role; the Coalition of Small Island States has thrust global warming onto the human rights agenda, and Canadian Inuit and other northern dwellers have begun a similar process. There is some room to work within the context of regional economic agreements such as NAFTA to pursue climate change-related policies. In other cases there are incidental benefits; for example, efforts to curtail the loss of biodiversity must be explicitly tied to habitat preservation, which protects carbon sinks.

If Canada is reluctant to further embrace Kyoto, it can nevertheless improve the odds of climate change mitigation and adaptation by pursuing a sustainable-development agenda that is both broad and multilaterally oriented. Most Canadians, still convinced that Canada is or could be a world leader in environmental policy, would support this. The hard work of serious consultation with the provinces and local groups lies ahead; the need to keep public pressure on the Conservatives is self-evident. But it might be a blessing in disguise to re-open the debate over Kyoto commitments and to frame a dialogue in which Canada admits the impossibility of meeting inflated targets but renews efforts to achieve realistic targets instead, while looking further down the road at adaptation measures and even more demanding targets than originally envisioned. One of the inherent dangers with such a sweeping agenda as that presented by the UNFCC and Kyoto, beyond the temptation to sign on without commensurate and consensual understandings of the consequences, is that the public might assume a "that job is done" attitude. This job has just begun, with or without Kyoto, and every Canadian (and American) should be made aware of this.

> "Meanwhile, the Kyoto machine chugs on, with hundreds of government employees carrying on as though the Kyoto protocol is an assumed contextual variable in international affairs

NOTES

1. Thanks to Stacy VanDeveer and Henrik Selin for comments on an initial draft of this paper; and to David Biette and Geoff Dabelko for support from the Woodrow Wilson International Center for Scholars.

2. See http://www.cbc.ca for a timeline on major Canadian policy initiatives on climate change. Government websites have been stripped of much of their content following the changes introduced by the Harper government.

3. Note that the CEPA overhaul is not a Conservative initiative, as it is up for review regardless of the government in power. There is concern also that the revamping of CEPA might eliminate the move in late 2005 to add the "Kyoto six" greenhouse gases (namely: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). While in opposition the, Tories were opposed to their inclusion, especially with regard to the first two GHG sources.

4. LFEs are found in the primary energy production, electricity production, mining, and manufacturing sectors. This covers about 700 companies operating in Canada; 80-90 of these companies account for approximately 85 percent of GHG emissions by LFEs. Even the Liberals had exempted automobile manufacturers, however (though a voluntary reductions agreement had been reached, as mentioned above).

5. Herb Dhaliwal, Minister of Natural Resources, September 5, 2002: "Canada has no intention of meeting the conditions of the Kyoto Protocol on greenhouse gases even though the government hopes to ratify it this fall." Quoted in Bruce Cheadle, "Canada to Sign Kyoto, but Won't Abide by it," *Toronto Star*, September 5, 2002, online, available at http://www.theStar.com.

6. Note that per-capita emissions rates have not grown at the same rate as overall national emissions; therefore population growth itself is an obstacle to meeting the Kyoto commitments as they are presently framed. See Kettner et al., 2006.

7. This scenario was stressed by co-panelist Tim Kennedy.

8. "It was only after the United States rejected the Kyoto Protocol that the EU was able to promote emissions trading as a legitimate strategy to meet the Kyoto target. Emissions trading was reframed from an illegitimate attempt to shirk responsibilities to reduce domestic emissions into the best option to salvage the Kyoto Protocol without American participation." (Cass, 2005).

9. See Suzuki Foundation, *Risky Business: How Canada is Avoiding Kyoto Action with Controversial Projects in Developing Countries* (Vancouver, October, 2003).

10. This is referred to as "norm entrapment" in the regime literature (Risse, 2000). On the need to move toward serious discussions of adaptation, see Bell (2006).

11. See the relevant website at CIDA, available at http://www.acdi-cida.gc.ca/cida_in. Subsequent statistics in this paragraph were taken from this source.

12. The pine beetle has swept across British Columbia and scientists fear it will "cross the Rocky Mountains and sweep across the northern continent into areas where it used to be killed by severe cold … U.S. Forest Service officials say they are watching warily as the outbreak has spread." The United States is less vulnerable because it "lacks the seamless forest of lodgepole pines that are a highway for the beetle in Canada." By the time we hear more about the beetle highway, it may be too late to recover. Quotes from Doug Struck in an article written for the *Washington Post* and reprinted in *The Montreal Gazette*, "Our Forests Are a Feast," March 5, 2006, p. A10.

13. The latter involves the United States, Australia, India, Japan, China, and South Korea, and seeks ways to develop innovative technologies to reduce emissions rather than to set strict targets for emission reductions.

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Second Generation Climate Policies in the United States: Proliferation, Diffusion, and Regionalization

BARRY G. RABE

More than fifteen years after signing the Rio Declaration on Environment and Development and nearly a decade after its signing of the Kyoto Protocol, the U.S. federal government has maintained its posture of disengagement from climate policy. Congress rejected a series of legislative proposals in 2005 that would have established modest targets for containing the growth of greenhouse gas emissions from major sources. Even Congressional passage of one of these bills would likely have been blocked by a presidential veto. At about the same time, President George Bush rejected strong pressures to accept some new greenhouse gas initiatives as the G-8 group of developed nations gave new attention to climate change.

This familiar tale, however, fails to provide a complete picture of the evolving U.S. engagement in climate policy. Indeed, at the very time federal institutions continued to thrash about on this issue, major new initiatives were launched, with bipartisan support, in such diverse state capitals as Sacramento (Calif.), Carson City (Nev.), Santa Fe (N.M.), Austin (Tex.), Harrisburg (Penn.), Albany (N.Y.), and Hartford (Conn.). By the middle of the current decade, more than half of the U.S. states could be fairly characterized as actively involved in climate change policy, with one or more policies that promised to significantly reduce their greenhouse gas emissions. Virtually all states were beginning to at least study the issue and explore very modest remedies. A growing number of these—such as California, Connecticut, New Jersey, and New York—were every bit as engaged on multiple policy fronts as counterparts in European capitals and far more active than all Canadian provinces except Manitoba. These programs are beginning to have some effect on stabilizing emissions from their jurisdictions. Indeed, many states are major sources of greenhouse gas emissions, and thus state programs offer considerable potential for reducing emissions. If the fifty states were to secede and become sovereign nations, thirteen would rank among the world's top forty nations in emissions, led by Texas in seventh place ahead of the United Kingdom (Rabe, 2004).

There are, of course, profound limitations on what states, acting individually or collectively, can do to reverse the steady growth of American greenhouse gas releases of recent decades. States face enormous constitutional constraints, including prohibitions against the negotiation of international treaties and restrictions on commercial transactions that cross state boundaries. This paper will consider the historic role of U.S. states in national policy development and particular drivers that seem pivotal in the case of climate change. It will also examine the evolution of state climate policy, with particular attention to new trends that have emerged in the past few years. Finally, we will consider possible limitations facing state-driven policy and opportunities for these state-level developments to continue to expand and ultimately define a unique U.S. response to this enormous policy challenge.

BOTTOM-UP POLICY

Many accounts of U.S. public policy are written as if the United States operated as a unitary system, whereby all innovations and initiatives emanate from the federal government. A more nuanced view of U.S. federalism indicates that states have often served a far more expansive and visionary role. The potential for early and active state engagement on policy issues has intensified in recent decades, as the capacity of most state governments has grown markedly. This has led in many instances to dramatic increases in state revenue and expansion of state agencies with considerable oversight in all areas relevant to greenhouse gases, including environmental protection, energy, transportation, and natural resources. Even in areas with significant federal policy oversight, states have become increasingly active and, in some cases, fairly autonomous in interpretation, implementation, and innovation.

Extending such resources and powers into the realm of climate change is a fairly incremental step in some instances, such as electricity regulation, where state governments have been dominant for decades. But the burgeoning state role must be seen as not merely an extension of existing authority but rather a new movement of sorts driven by a set of factors distinct to the issue of climate change. These factors have proven increasingly influential in a wide range of jurisdictions, overcoming inherent opposition and building generally broad and bipartisan coalitions for action. In some jurisdictions, this dynamic has advanced so far that one of the greatest conflicts in climate policy innovation is determining which political leaders get to "claim credit" for taking early steps. The following factors appear to be pivotal drivers behind action in numerous states.

Climate Impact

Contrary to the rather acrimonious interpretations of climate science in national policy circles, individual states have begun to feel the impact of climate change in more immediate ways. These impacts differ by jurisdiction but are often buttressed by state-based researchers working cooperatively with state regulatory agencies in attempting to discern localized indicators of climate impact. Among coastal states, for example, concern is often concentrated on the impact of rising sea level, particularly given the substantial economic development along many shores at relatively low sea level in the United States. This dynamic has influenced state governments from Honolulu (Hawaii) to Trenton (N.J.). No two states have faced identical experiences, but a common theme suggests that individual states and regions have begun to face direct impacts, thereby taking the climate change policy debate from an acrimonious battle over graphs and charts toward something that touches real life experience and legitimizes a policy response.

> "Virtually all states that have responded to the challenge of climate change have done so through methods that they deem likely to reduce greenhouse gas emissions but simultaneously foster economic development.

Economic Development

Virtually all states that have responded to the challenge of climate change have done so through methods that they deem likely to reduce greenhouse gas emissions and simultaneously foster economic development. Active state promotion of renewable energy, through a combination of mandates and financial incentive programs, has focused upon development of "home grown" sources of electricity that promise to both stabilize local energy supply and promote significant new job opportunities for state residents. Many states with active economic development programs have concluded that investment in the technologies and skills needed in a less-carbonized society in coming decades is a sound bet. In response, they have advanced many policy initiatives in large part in anticipation of economic benefits. Even some states with substantial sectors that generate massive amounts of greenhouse gases, such as coal-intensive Pennsylvania,

have begun to shift their thinking toward the opportunities for longer-term economic development presented by investment in renewable energy.

Agency Advocacy

Many states worked intensively in recent decades to build in-house capacity on the environment, energy, and other areas that now have direct relevance to climate change. Consequently, state agencies have proven increasingly fertile areas for "policy entrepreneurs" to develop ideas that are tailored to their state's needs and opportunities. These ideas can then be translated into legislation, executive orders, and pilot programs. State officials also have proven effective in forming coalitions, often cutting across partisan lines in the legislature and engaging supportive interest groups where feasible (Rabe, 2004; Mintrom, 2000). No two states have assembled identical climate policy constituencies, nor have any devised identical policies. But state agencies have been significant drivers behind innovation, whether in the stages of developing policy ideas or seeing them through to policy formation. In more recent years, state-based environmental advocacy groups and private firms that might benefit financially from climate policy have become increasingly visible and active in bringing about far-reaching initiatives. This has created broader supportive coalitions for new policy development, although some schisms have begun to emerge, such as between competing providers of renewable energy (Rabe and Mundo, 2007).

ENTERING THE SECOND GENERATION OF STATE CLIMATE POLICIES

The sheer volume and variety of state climate initiatives is staggering, hard to measure with precision, and subject to expansion. Much policy analysis has been so heavily focused on federal or international-level actions that state or other sub-national policies have received markedly less attention. This paper draws from ongoing refinement of climate policy profiles for all 50 states, representing a confluence of interviews, government documents and reports, and legislative histories, as well as sector-specific data acquired from state-based professional associations. These sources help distill current developments and highlight emerging trends in a "second generation" of state climate policy.

Continuing Proliferation

Perhaps the most evident trend in state policy engagement on climate change is that the number of states involved as well as aggregate number and range of policies continues to expand on a monthly basis. As of mid-2006, this trend showed no signs of slowing; it may in fact be accelerating. More than half of the states have enacted at least one piece of climate legislation or passed at least one executive order that sets formal requirements for reducing greenhouse gases; 18 states have passed multiple laws designed to achieve such reductions. Forty-seven have completed greenhouse gas inventories and 22 have set forth "action plans" to guide future policy. In six cases, states have formally established statewide commitments to reduce production of greenhouse gases over future years and decades, linked to policies designed to attain these reduction pledges. Renewable energy, discussed further below, has been a particularly popular area of engagement, with 22 states enacting so-called "renewable portfolio standards" (RPS) that mandate a formal increase in the amount of electricity distributed in a state that must be generated from renewable sources. Fifteen states have established their own version of carbon taxes, through so-called "social benefit charges" that allocate their revenues to renewable energy development or energy efficiency projects. In transportation, 10 states have agreed to follow California in establishing the world's first carbon dioxide emissions standards for vehicles and 12 states are engaged in some form of capping carbon emissions from electrical utilities.

Alongside the sheer magnitude of state policies, these efforts are generally becoming more rigorous in terms of the levels of emission reductions that they are seeking. There has been a gradual shift in state policy over the past decade, with voluntary initiatives increasingly supplanted with regulatory efforts. Most of these policies retain considerable flexibility in terms of compliance, consistent with the credit-trading mechanisms popular among most nations that have ratified Kyoto. But their rigor is steadily increasing, along with the likely impact on greenhouse gases if faithfully implemented. In turn, states continue to have multiple motivations for pursuing these respective policies but are becoming increasingly explicit and forceful in articulating the climate benefits,

among others. This runs somewhat contrary to earlier practice, whereby many states were aware of potential climate impact but said little if anything about this element of a proposed policy. This newer pattern is particularly evident among current and recent state governors with prominent national profiles, some with aspirations for higher office, such as Arnold Schwarzenegger of California, other Republicans such as George Pataki of New York and Mitt Romney of Massachusetts and such Democrats as Bill Richardson of New Mexico and Tom Vilsack of Iowa. Indeed, it is possible to envision presidential primaries, in 2008 or 2012, where multiple candidates may emanate from statehouses from which they can claim more constructive climate policy engagement than any of their recent presidential predecessors.

Diffusion across the States

Much of the existing infrastructure of state climate programs has been individually tailored to the needs of a particular state. However, there is increasing evidence that some policies enacted in one state ultimately are being replicated in one or more additional states. There is, in fact, precedent in other policy arenas for such "policy diffusion" to spread across the nation and become, in effect, *de facto* national policy. Under such circumstances, it may be possible for the states to simply negotiate inter-state differences and implement these inter-related programs. There may also be some tipping point at which diffusion reaches sufficient numbers of states that the federal government concludes that it should respond by drawing from these state models and establishing some version of this on a national basis.

"Indeed, it is possible to envision presidential primaries, in 2008 or 2012, where multiple candidates may emanate from statehouses from which they can claim more constructive climate policy engagement than any of their recent presidential predecessors.

There are several areas in which climate policy enactment in one jurisdiction has already been duplicated elsewhere. The policy tool that appears to be diffusing most rapidly is the RPS, which was operational in 22 states as of mid-2006. The first RPS was enacted in 1991 in Iowa, with little if any attention to greenhouse gas impacts. Subsequently, the pace of adoption has intensified, with four new RPS programs approved in 2005 and three existing ones significantly expanded during that period. Collectively, these policies are projected to add 26,000 megawatts of renewable electricity by 2015.

Particular RPS features vary by state but all such programs mandate a certain increase over time in the level of renewable energy that must be provided by all electricity providers in a state. For example, the State of Nevada passed legislation in June 2005 that will require that state's utilities to gradually increase their supply of renewable energy, ultimately reaching 20 percent by 2015. This legislation passed with unanimous support in both legislative chambers and was endorsed by Republican Governor Kenny Guinn. It built on a set of earlier laws, each expanding the state's promotion of renewable energy. Nevada, like virtually every other state that has enacted an RPS, provides regulated utilities considerable flexibility in finding ways to meet renewable mandates through so-called "renewable energy credit" programs that function much like other market-based programs and promise to reduce compliance costs.

RPS programs appear likely to continue to diffuse in coming years, reflecting recent legislative enactments and the continuing exploration of this approach as a policy option in a number of other state legislatures. In turn, several states with established RPSs, such as Texas, have found them so successful in terms of their ability to add renewable energy at reasonable costs, that they are looking actively to "increase the bar," building on the exponential rate of renewable energy growth of recent years with a substantial increase in future mandate levels (Texas PUC 2005). Ironically, this U.S. state pattern coincides closely with the experience of the European Union, where a growing number of nations—including

Denmark, Sweden, and the United Kingdom—have adopted their own RPSs as central components of their plans for meeting greenhouse gas reduction obligations (Rowlands, 2004). One growing challenge as RPSs proliferate will be differential state requirements, ranging from varied definitions of what constitutes renewable energy to state efforts to maximize generation of in-state renewable sources for economic development reasons. The former issue poses challenges for renewable energy market development in areas where generators serve multiple states whereas the latter raises questions of state adherence to the Commerce Clause of the U.S. Constitution (Rabe, 2006).

Regionalism: Between Nation and State

There is also ample precedent in U.S. federalism for states to work cooperatively on common concerns and, in some instances, formalize regional approaches involving two or more states (Zimmerman, 2002). Some regional strategies take a permanent structure, such as interstate compacts, which involve a formal agreement ratified by participating states and ultimately Congress. These have been used extensively among states that share responsibility for an ecosystem or common boundary. Other strategies may entail establishing multi-state organizations or commissions to facilitate ongoing negotiation over particular issues or less formal agreements outlining reciprocal policy commitments.

As state climate policies proliferate and diffuse, it is entirely possible that certain clusters of states may become regions in practice even in the absence of formal agreements. All southwestern states between California and Texas, for example, have an RPS. It is increasingly possible to envision inter-state trading of renewable energy credits and other forms of cooperation that link these state programs. But more formal regional arrangements are also under consideration, perhaps most notable among northeastern states, where relatively small physical size and heavy population foster considerable economic and environmental interdependence. States in this region have a strong tradition of working together, whether campaigning for federal air emission standards to deter acid rain or common regional standards negotiated with the U.S. Environmental Protection Agency's New England office.

For more than three decades, New England's governors have further formalized this partnership through an organization that links them in cooperative ventures with the five eastern provinces of Canada. The respective premiers and governors meet annually, with environmental and energy concerns often paramount. In 2001, the leaders of these jurisdictions, representing five different political parties, agreed to common greenhouse gas reduction goals, reaching "at least" 10 percent below 1990 levels by 2020, followed by more significant reductions thereafter (Selin and VanDeveer, this volume). These goals are not formally binding, even in Canada, which has been bound by Kyoto after its 2002 ratification of the Protocol. But they have triggered exploration of common strategies and prodded some jurisdictions, particularly participating states, to take more aggressive steps on climate policy than ever before.

Perhaps the most vibrant regional initiative that involves U.S. states is the so-called Regional Greenhouse Gas Initiative. RGGI was launched in 2003, when New York Governor Pataki invited his counterparts from 10 neighboring states and Washington, D.C.'s mayor to explore the possibilities of establishing a regional cap-and-trade program for reducing carbon dioxide emissions from all fossil fuel-burning power plants located within the region. At this point, states such as Massachusetts and New Hampshire had already taken formal action to cap greenhouse gas emissions from their own coal-burning plants and similar steps were under consideration elsewhere. New York completed a multi-year review to confront climate change, which included a number of renewable energy initiatives and a pledge to reduce emissions five percent below 1990 levels by 2010 and 10 percent below 1990 levels by 2020. But state policy analysts concluded that a regional approach to cap-and-trade would be more cost-effective given the strong inter-state linkages in regional electricity distribution.

New York reached agreement in December 2005 with six other states (Connecticut, Delaware, Maine, New Hampshire, New Jersey, and Vermont) on a regional cap-and-trade program. Maryland joined RGGI in 2006, Massachusetts and Rhode Island were active in negotiations but have decided for now not to join, and Pennsylvania, Washington, D.C., and the province of New Brunswick continue as formal observers and may ultimately decide to join the initiative. Development of a model rule addressing all key provisions continues through 2006, with the goal of formally launching the cap-and-trade program in January 2009. RGGI would cap regional emissions at 2009 levels through 2014, and then reduce these 10 percent below that level by 2018.

The RGGI process emulates some of the framework for interstate coordination in reducing nitrogen oxides emissions in the northeastern Ozone Transport Region, but entails exclusively a negotiation among states without any input from federal officials. Consequently, a major RGGI goal is to establish and implement a regional carbon emissions cap while "accommodating, to the extent feasible, the diversity in policies and programs in individual states" (RGGI, 2005). In that regard, RGGI bears a rather significant resemblance to Europe's Emissions Trading System (ETS) that was launched in February 2005 and has triggered "informal contacts between state officials and representatives of the European Commission and European member states" (Kruger and Pizer, 2005).

Yet another variant of a multi-state approach involves an extension of "regionalism" to include states that are not necessarily contiguous with one another. Under federal air pollution legislation, for example, California enjoys unique status that it can parlay to establish a network of states with regulatory standards more stringent than those of the federal government. Congress concluded in the 1970s that California was so far ahead of the federal government in confronting air emissions that it could take any emerging federal air standard as a minimum from which it could establish its own regulations. The remaining states would then be free to adhere to federal standards or join forces with California, often unleashing "upward bidding" in air policy.

California chose in 2002 to revisit those powers, becoming the first Western government to mandate carbon dioxide caps for motor vehicles. This took the form of legislation, signed by former Democratic Governor Gray Davis that went to considerable lengths to characterize carbon dioxide as an air pollutant and therefore a natural extension of its regulatory powers. The state has continued to assert that this does not encroach on fuel economy standards, which clearly remain under federal control. Since enactment, the California Air Resources Board has moved toward implementation, which is scheduled to go into effect later in the current decade and could achieve reductions of up to 30 percent in vehicle emissions in future fleets. This legislation has been a cornerstone of a larger California effort on climate change, which has resulted in some of the lowest per capita emission rates of any state and relatively modest emission growth since 1990 (Brown, 2005). In fact, under Republican Governor Schwarzenegger, the state has only intensified its efforts on climate, leading to his June 2005 executive order that vowed to return California to 2000 emission levels by 2010, followed by a return to 1990 levels by 2020 and reductions that are 80 percent below current levels by 2050.

These steps have already had effects beyond state boundaries. Within two weeks of the Schwarzenegger executive order, New Mexico's Richardson proposed comparable reductions through his own executive order authority. Perhaps more important, 10 states have formally approved the California vehicle standards for carbon. These include the States of Oregon and Washington and eight Northeastern states, with decisions pending in additional states. This creates the very real possibility of two separate "regional" standards for vehicular emissions, including the "coastal strategy" (involving California and collaborating East and West Coast states) alongside the central states. Litigation from automobile manufacturers and the Bush administration will ensue, based on alleged state encroachment on federal terrain. Nonetheless, this additional re-definition of regionalism illustrates the array of possibilities whereby multiple states might begin to pool their efforts and work collaboratively.

Direct Democracy: Taking It to the People

Direct democracy has been an alternative route for policymaking in more than 30 states for nearly a century, reflecting its origins in the populist and progressive movements. But its use in the state context has grown at an exponential rate over the past two decades, particularly in the controversial arenas of environmental and energy policy (Guber, 2003). Indeed, state constitutions impose few if any restrictions on the kinds of

> "Just as some states lead while others lag in U.S. climate policy development, it is increasingly clear that a similar dynamic operates among European nations.

policy questions that can be addressed through direct democracy and a number of states, such as California and Oregon, make extensive use of this provision.

In November 2004, state climate policy moved from the exclusive realm of representative institutions into the arena of ballot propositions. Colorado voters, by a 54-to-46 margin, approved Proposition 37, which established an RPS for that state. This initiative set forth an ambitious target for steadily increasing the level of electricity in the state derived from renewable sources from its current level of approximately two percent to 10 percent by 2015. Many other provisions in this legislation are comparable to RPSs elsewhere. What makes Colorado unique is that proponents turned to direct democracy after three efforts to enact such a statute were narrowly defeated in the Colorado legislature.

In Colorado, a bipartisan group led by the Republican Speaker of the State Assembly and a Democratic member of the U.S. House of Representatives assembled a very broad coalition, attracting agricultural, environmental, and public health, as well as manufacturers of renewable energy systems that stood to gain from the legislation. Most major media outlets in the state offered strong endorsement. Despite a massive opposition campaign led by the state's dominant utility, Xcel Energy, the proposition is now state law and has moved through an extensive rule-making process.

Other environmental cases suggest that once one state turns to the ballot on a salient issue others often follow suit. Ironically, the RPS issue continues to move apace in many jurisdictions, with Montana following Colorado—through conventional methods—shortly thereafter. But this sets an important precedent and further underscores the possibilities for expanding the state role in climate policy development. Indeed, climate policy proponents in other states, most notably Oregon and Washington, have already begun to examine the Colorado case in some detail in weighing possible next steps.

State Attorneys General: Taking It to the Courts

Alongside citizen-driven policy, states also have turned increasingly to litigation against their neighbors or the federal government for actions—or inactions—seen to cause environmental harm to their states and citizenries. The vast majority of state attorneys general are elected officials, many of whom become very prominent figures in state governance (Provost, 2003). They often possess considerable independence from their respective governors and have proven increasingly bold in expanding the definition of their roles. Huge shifts in policy have followed attorney general-led interventions in such areas as regulation of the tobacco and financial services industries (Derthick, 2005). There are strong signals that climate policy is emerging as the next target for this type of engagement.

In recent years, a loose coalition of attorneys general has formed, exploring ways in which they might develop litigation to force the federal government to act. For example, in February 2003, attorneys general from California, Connecticut, Illinois, Maine, Massachusetts, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, and Washington, filed suit in federal court challenging a Bush administration decision to exclude carbon dioxide as a pollutant regulated under the 1990 Clean Air Act Amendments (Letter from Spitzer, 2003). Other initiatives have followed, contending that climate change is posing a significant threat to state residents and seeking a judicial remedy that would force some degree of active federal engagement.

Such steps have often been endorsed and supported by coalitions of environmental groups and state regulatory agencies, which often supply detail and expertise in fashioning the litigation strategy. It remains much too soon to discern what impact, if any, these respective approaches might have, since they move the federal courts into new policy terrain and are likely to receive very different hearings in respective federal judicial districts. Nonetheless, they represent yet another strategy that states appear increasingly willing to employ in assuming a lead role in U.S. climate policy formation. This approach, of course, appears particularly unique in that it is designed not to result in intra-state action or inter-state cooperation. Instead, the focus is finding state-based policy levers that might compel a recalcitrant federal government to take action on the climate issue.

THE SECOND GENERATION AND BEYOND

At mid-point of the current decade, there is no sign whatsoever of a slowing pace in state engagement on climate change. If anything, most trends point in the opposite direction. Long-active states are expanding their efforts and elevating their reduction commitments. Long-dormant states are, in some instances, showing signs of engagement. Consequently, one could increasingly envision a U.S. climate policy system emerging from a bottom-up basis, with an expanding and perhaps permanent role for states to play in continued policy development and implementation. In certain respects, this appears to parallel the experience in other federal or federated systems, whether or not they have ratified Kyoto.

In Europe, for example, striking parallels exist with the case of the United States. The European Union remains formally bound to meeting Kyoto reduction targets, which led to the launch of the ETS in 2005 and the first volley of cross-national carbon credit trading. However, each EU member has a different reduction target and is free to establish its own internal policies. This has resulted in a tapestry of different strategies and wide variation in the degrees of success for individual nations in approaching their pledged reductions. Just as some states lead while others lag in U.S. climate policy development, it is increasingly clear that a similar dynamic operates among European nations. Australia appears to be following an American pattern, with growing state involvement amid federal disengagement. However, this phenomenon is not universal in federal systems, reflected in the glacial pace of climate policy development in Canada and its provinces despite federal ratification of Kyoto (Rabe, 2007).

At the same time, there may be three distinct challenges facing continued or expanding state involvement on climate policy, some unique to the context of the United States. These have yet to have any demonstrable effect on state policy but could potentially have a chilling impact. First, a consortium of well-heeled organizations hostile to any U.S. government action to reduce greenhouse gases has become increasingly vocal in the state policy-making process. Organizations such as the Heartland Institute and Competitive Enterprise Institute have published reports that portray state-based initiatives as posing dire economic and social consequences. Such releases routinely condemn state climate policies as "mini-Kyoto regimes," offering catastrophic estimates of their future economic impacts. Perhaps most importantly, the American Legislative Exchange Council has launched an aggressive campaign to reverse or rescind existing state climate laws, although it has had little demonstrable effect on state policy thus far (ALEC, 2006).

Second, it appears increasingly likely that various interest groups and the executive branch of the federal government may join forces in bringing legal or administrative challenge against many state climate policy initiatives on constitutional grounds. This is somewhat ironic given the long-standing emphasis in the Republican Party on the virtues of decentralization and the fact that so many Bush administration leaders, including the president, were leaders in climate policy development when they worked in their respective statehouses (Whitman, 2005). Nonetheless, there are growing indications that serious challenges may ensue. Perhaps the most prominent confrontation will focus on the California vehicle emissions program, but other challenges are also possible through the route of preemption via legislative or administrative action.

Third, as a growing number of states become active players in climate policy development and implementation, inevitable questions emerge regarding inter-state collaboration. This is most apparent in cases such as RGGI, which require considerable cooperation between multiple states where turnover of elected officials is a constant. Despite the substantial body of agreement reached among RGGI states, a number of questions remain concerning long-term viability. New York launched the process and has footed much of the bill to date. However, some states have begun to complain that it has become too dominant in inter-state deliberations. Issues such as locating a RGGI office or the degree of collaboration with existing regional environmental authorities, such as the Northeast States for Coordinated Air Use Management, remain points of contention, before moving into even trickier issues such as defining acceptable offsets and addressing "carbon leakage" from energy imports outside the RGGI cap. The decisions of Massachusetts and Rhode Island to refrain from joining RGGI, at least for now, further underscore the fragility of such a complex intergovernmental network that moves forward without constructive input from the federal government.

> It appears reasonable to anticipate continued state climate policy engagement in coming years, giving a growing set of states a level of climate commitment and expertise that rivals the most aggressive nations pursuing Kyoto.

Despite these potential impediments, all indicators suggest that climate policy has not only reached the agenda of most state capitals but is actively moving ahead with fairly broad political support. It appears reasonable to anticipate continued state climate policy engagement in coming years, giving a growing set of states a level of climate commitment and expertise that rivals the most aggressive nations pursuing Kyoto. All of this suggests that the U.S. context for climate policy is far more complex—and far less fruitless—than many conventional depictions would suggest. Moreover, there are abundant precedents in other policy areas whereby states take the lead and remain active in long-term policy development and implementation. Consequently, there is ample reason to suspect that states will remain central players in the evolution of U.S. climate policy, with considerable potential for achieving emission reductions and providing lessons and models worthy of consideration in Washington and around the world.

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Climate Leadership in Northeast North America

HENRIK SELIN AND
STACY D. VANDEVEER

Most innovative and ambitious policymaking efforts related to climate change in the United States are developing at regional, state, and local levels. A growing number of states, municipalities and firms across the country are initiating climate change action beyond requirements mandated by the federal government. State governments have been particularly active in their attempts to address climate change concerns and various aspects of contemporary energy production and use (Rabe, 2004; Pew, 2006; Rabe, this volume). As of May 2006, the Pew Center on Climate Change lists 48 case studies in 31 states of relevance to climate change mitigation. Combined, these efforts have measurable effects on greenhouse gas (GHG) emissions reductions, as many U.S. states are very large GHG emitters (Rabe, 2004; Selin and VanDeveer, 2005).

In short, states' influence in U.S. environmental policymaking is significant. State officials and policymakers can address GHG emissions directly through policy measures addressing GHG emissions from power plants, transportation, land use and planning, agriculture and forestry, waste management, and public sector operations and spending. In this respect, states serve as "policy laboratories" for climate change mitigation and adaptation and, in the process, may exercise political pressure on future federal climate policy "from below." In addition, states implement many federal environmental laws, issue most environmental permits, and conduct a majority of environmental enforcement actions (Rabe, 2004). While Canadian provinces also hold much environmental policy authority vis-à-vis the Canadian federal government, they have generally been more reluctant to initiate substantial climate policy efforts of their own (Selin and VanDeveer, 2005; Stoett, this volume).

Since the late 1990s, there has been a noticeable expansion of state policymaking on climate change and energy issues (Rabe, 2004; Selin and VanDeveer 2005; Rabe, this volume). State officials have also initiated several collaborative actions around climate policy in recent years, sometimes including participation of Canadian provinces in their regional initiatives. Examples of multi-state cooperation include the West Coast Initiative (California, Oregon, and Washington), the Southwest Climate

> "Most innovative and ambitious climate change related policymaking efforts in the United States are developing at regional, state, and local levels.

Change Initiative (Arizona and New Mexico), and the Powering the Plains Initiative (North Dakota, South Dakota, Minnesota, Iowa, Wisconsin, and the Canadian province of Manitoba) (Pew, 2006). The most ambitious regional efforts, however, are developing in Northeast North America, and several of these efforts include participation by both U.S. states and Canadian provinces.

This paper briefly assesses two major regional climate change policy initiatives in the Northeast: the 2001 Climate Change Action Plan of the New England Governors Conference and the Easter Canadian Premiers (NEG-ECP) and its implementation, and ongoing efforts to establish a regional cap-and-trade scheme for carbon dioxide (CO_2) emissions from power plants under the Regional Greenhouse Gas Initiative (RGGI). In addition, the paper reviews the development of growing municipal and civil society engagement on climate change issues and GHG mitigation in the region. It concludes with a discussion of possible ramifications and limitations of climate change policymaking in Northeastern North America.

CLIMATE CHANGE ACTION IN THE NORTHEAST

Regional cooperation among states in the Northeast includes two separate, but related and overlapping, initiatives. First, a regional Climate Change Action Plan was signed by the governors of six New England states and the premiers of five Eastern Canadian provinces in 2001. Second, RGGI, initiated in 2003, seeks to establish a cap-and-trade scheme for CO_2 emissions from power plants from Maryland to Maine.

NEW ENGLAND GOVERNORS AND EASTERN CANADIAN PREMIERS

The collaborative effort by the New England governors and the Eastern Canadian premiers includes all six New England states (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut) and five Eastern Canadian provinces (Nova Scotia, Newfoundland and Labrador, Prince Edward Island, New Brunswick, and Quebec). Under the joint 2001 Climate Change Action Plan, participating states and provinces commit to reduce GHG emissions to 1990 levels by 2010 and to achieve 10 percent reductions below 1990 levels by 2020. The plan calls for ultimate emissions reduction to levels that do not pose a threat to the global climate system. According to an official estimate, achieving this goal would require a 75 to 85 percent reduction from 2001 emissions levels.[1] The plan and its goals have been repeatedly reaffirmed by the region's governors and premiers since 2001, most recently in May of 2006.

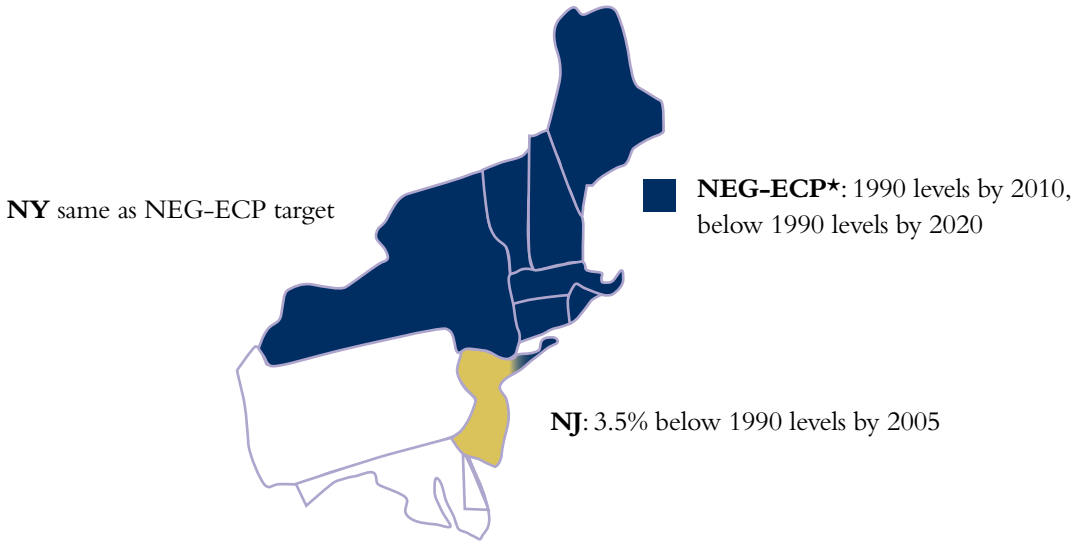
The NEG-ECP plan outlines nine general actions and goals pursuant to the regional emissions reduction targets:

1. Establish a regional standardized GHG emissions inventory
2. Establish a plan for reducing GHG emissions and conserving energy
3. Promote public awareness of climate change issues
4. State and provincial governments to lead by example
5. Reduce GHG emissions from the electricity sector
6. Reduce total energy demand through conservation
7. Reduce and/or adapt to negative social, economic, and environmental impacts
8. Decrease the transportation sector's growth in GHG emissions
9. Create of a regional emissions registry and explore a trading mechanism.

The plan also outlines 34 more specific policy recommendations for the implementation of these nine action steps. Some of these recommendations involve building regional institutions for continued policymaking and implementation review. Others call for policymaking by states in support of the regional policy goals and emissions reduction targets. In addition, the plan's recommendations contain provisions for outreach efforts to private and public sector groups and the general public. Since 2001, state and provincial officials have worked to develop and implement state/provincial level policies and programs in support of the regional plan (Selin and VanDeveer, 2005).

To date, state and provincial officials have focused their attention on the launching of relatively small-

FIGURE 1: State GHG Reduction Targets in the Northeast



scale abatement programs. Efforts have focused on "smart growth" and "no-regrets" measures seeking to reduce both public financial costs and GHG emissions. Examples of such measures include the use of more efficient light emitting diodes in traffic lights, promoting the purchase of Energy Star products in state governments, and switching to more energy-efficient vehicles in state vehicle fleets. Though relatively small in size and ambition, such programs can save states millions of dollars in public expenditures annually and contribute to reductions in regional GHG emissions (Hamel, 2003). Figure 1 shows the NEG-ECP GHG reduction goals of the New England states as well as those set individually by New York and New Jersey.

State efforts and accomplishments to date vary substantially, however (New England Climate Coalition, 2003; 2004; 2005). In 2003, Maine was first to write the NEG-ECP goals into state law. In 2004, Connecticut passed similar legislation. Connecticut, Rhode Island, Maine, and Massachusetts have issued state-level climate change action plans explicitly designed to achieve NEG-ECP goals. Some regulatory progress can also be noted in efforts to cap and reduce CO_2 emissions from power plants in Connecticut, New Hampshire, and Massachusetts. In addition, attorney generals of several states are participating in lawsuits against the U.S. federal government for failure to regulate CO_2 emissions. In general, the five Eastern Canadian provinces have been less aggressive in the development of climate policy than the New England states (Selin and VanDeveer, 2005; Stoett, this volume).

As of March 2006, all New England states except New Hampshire had adopted mandatory renewable portfolio standards. All six New England states have created public benefits funds designed to support energy efficiency and/or renewable energy development (Pew, 2006). Yet, old oil and coal-fired power plants remain in use across New England. For example, Environment Northeast (2003) estimates that replacing such facilities with more efficient natural gas plants could reduce Connecticut's GHG emissions by 60 percent. Increased use of renewable energy sources would allow for even more dramatic cuts in GHG emissions. Yet, local and political opposition to Cape Wind—a proposed large-scale wind farm in Nantucket Sound, Massachusetts—demonstrates that the expansion of renewable energy capacity can be highly contentious.[2]ector is negligible (NECC, 2005). Yet transportation generates approximately one-third of regional GHG emissions and increases in transportation related emissions alone make the NEG-ECP emission reduction goal for 2010 difficult to meet (MASSPIRG, 2003; NESCAUM, 2004).

However, eight Northeastern states have announced their intention to adopt California's vehicle standards for CO_2 if these survive legal challenges (Pew, 2006). In fact, some states in the region, including Massachusetts, are required under state law to adopt developing California vehicle emissions standards.

RGGI

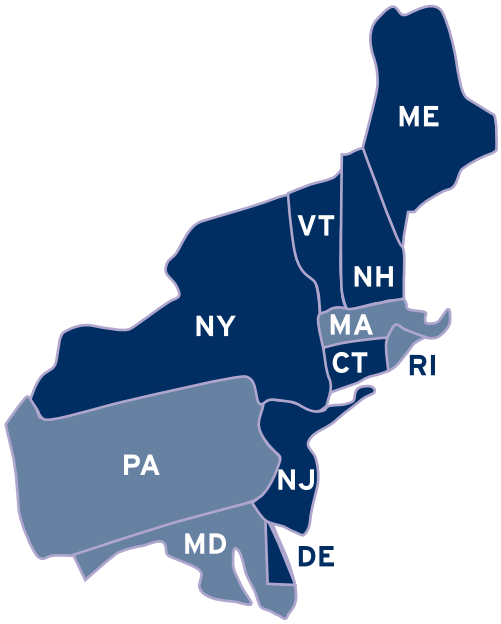
RGGI was proposed by Governor Pataki (New York) in April of 2003, when he invited states from Maryland to Maine to participate in discussions about a regional cap-and-trade system. Current RGGI members are Maine, Vermont, New Hampshire, Connecticut, New York, New Jersey, and Delaware. Maryland also recently announced its intention to join RGGI. Massachusetts and Rhode Island officials actively participated in the design of RGGI, but have so far not joined due to gubernatorial resistance. Many RGGI participants and observers, however, expect these two states to eventually join. Unlike the NEG-ECP program, RGGI does not include any Canadian provinces, but Canadian provincial officials have observed RGGI meetings (see Figure 2).

RGGI is intended to create a regional emissions inventory, registry, and trading mechanism for CO_2 emissions from power plants. After two years of negotiations among state officials and extensive debate, data gathering, and analytical modeling, a joint Memorandum of Understanding was signed by the governors of the seven participating states in December 2005. The fundamental rules of the trading scheme are outlined in a "model rule," which was finalized in August of 2006.[3] Most of the 105 submitted comments came from the energy sector and environmental and public interest NGOs. A few large energy users including WalMart also submitted opinions. The detailed nature of many of the comments illustrates the seriousness with which many firms and NGOs from both within and outside the region are engaging the RGGI process.

> RGGI is intended to create a regional emissions inventory, registry, and trading mechanism for CO2 emissions from power plants.

The final model rule will need to be implemented by all participating states pursuant to their state laws and regulatory processes. While some states plan to issue RGGI- compliant regulations through the executive branch, others will initiate legislative action. Under RGGI, states will determine which emissions sources should be regulated and set the regional emissions cap, or the maximum amount of CO_2 emissions allowed from all the regulated sources. States will issue one allowance for each ton of CO_2 emissions up to the amount of the total emissions cap. Each power plant is required to have enough allowances to cover its CO_2 emissions during each compliance period, if necessary by entering the market to purchase additional allowances from others. RGGI is scheduled to operate on the basis of three-year compliance periods, beginning in 2009.

FIGURE 2: RGGI Participating States



* States that signed the RGGI model rule are shaded more darkly than observing states. As of May 2006, Maryland has announced its intention to join RGGI.
** Source: http://www.rggi.org

RGGI, as outlined in the model rule, is designed to stabilize CO_2 emissions from the power sector from the start of the program in 2009 through 2015. From 2015 through 2018, each state's annual CO_2 emissions budget will decline by 2.5 percent per year, resulting in a total reduction of10 percent by 2019. In addition, some emissions reductions under the program can be achieved outside the electricity sector, through emissions offset projects. As RGGI has been developed and debated, much attention has been paid to the costs of the program to the region's firms and households through increased prices for electricity. The effect on residential rates is projected to be less than 1.5 percent through 2021. However, energy-efficiency components built into the program could in fact result in an overall positive economic effect (Brome, 2006).

The economic models on which the RGGI estimates are based are rather conservative regarding its economic benefits. Brome (2006) identifies two critical omissions in the models predicting a negative economic impact from RGGI. First, technological innovation may absorb some of the cost of reducing emissions. Many models predicted costly effects from the national sulfur dioxide (SO_2) trading scheme, but the program created incentives for industry to develop new technologies, which reduced their compliance costs. Similarly, regional costs from the cap on nitrogen oxides (NO_X) and trading scheme have been much lower than initially predicted (Aulisi, et al., 2005). Second, intensified technological innovation may mean that companies in the region benefit from these product developments as markets for low emissions technology grow.

RGGI moreover includes a price safety valve, which is currently proposed to expand the compliance period if the allowance price equals or exceeds $10/ton (in 2005 dollars) for twelve months (following an initial 14-month "market settling" period at the beginning of each compliance period). This provision has been heavily criticized by many environmental groups for weakening the program, but is designed to mitigate sharp price increases. Breslow and Goodstein (2005), however, show that of the 25 largest industries in Massachusetts (accounting for 81 percent of the state's total output of CO_2) only eight have electricity costs over 1 percent of their total operating costs. As projected rate increases from Massachusetts participation in RGGI would amount to less than 0.1 percent, they conclude that the economic impact of higher electricity rates to these companies would be modest even in the absence of technological development. Nevertheless, major Massachusetts-based companies such as Raytheon have lobbied aggressively against RGGI.

MUNICIPAL POLICY DEVELOPMENTS

Legendary Massachusetts native and former Speaker of the U.S. House of Representatives, Tip O'Neill, liked to say, "all politics is local." Many mayors in the Northeast are among the over 230 that have signed Seattle Mayor Greg Nickels' initiative calling on cities to meet or exceed U.S. commitments under the Kyoto Protocol (e.g. a 7 percent reduction in GHG emissions from 1990 levels by 2012), and lobbying the federal government to enact more stringent GHG legislation. Evidence that many public officials and citizens in the region want more stringent climate change policy can also be found in the 60-plus cities that have joined the International Council for Local Environmental Initiatives (ICLEI) and its Cities for Climate Protection (CCP) campaign. ICLEI was founded in 1993 to aid in the development of local climate policy through sharing information and other collaborative efforts (Betsill, 2001; Kousky and Schneider, 2003; Betsill and Bulkeley, 2004).

Many municipalities in the Northeast are developing and implementing climate change action plans pursuant to the CCP program. Local officials cite multiple reasons for taking such action, including the responsibility to "contribute to the cumulative solution to climate change" (City of Cambridge, 2002). Many Northeastern CCP members initiated climate change action before, or around the same time as, state-level climate policies were developing. While municipal policies can supplement state action, the two governance levels have not been linked through any formal cooperative agreements in the region. Yet, municipal climate change action plans often note their intentions to lobby for state and federal climate policy through their local actions (City of Cambridge, 2002). Municipal leaders also use local newspapers to call on state and regional leaders to take supportive actions on a larger geographical scale (Cohen and Murray, 2003).

Municipalities, like states, choose to lead by example and design various policy solutions to the environmental and energy challenges they face. Doing so, municipalities also tend to focus on "no-regrets" measures designed to reduce GHG emission through energy- saving measures. For example, municipalities and firms can collaboratively engage in green building practices and the registration of green buildings under the U.S. Green Building Council.[4] These efforts are based on the LEED (Leadership in Energy and Environmental Design) Green Building Rating System, a voluntary national standard. Practical actions involve installing photovoltaic systems, constructing with recycled materials, maximizing daylight, minimizing heat/cool air losses, and using sensor lighting. Boston, for example, has included in its zoning code that that all large projects built in the city should be LEED certifiable.

Another example of a municipality leading by example is Hull, located on the coast of Massachusetts. In 2001, Hull officials commissioned the construction of a municipally owned 660-kilowatt wind turbine. The turbine powers the city's streetlights and traffic lights, with the remaining power up for sale. The turbine saves the small town about $185,000 each year and averts hundreds of tons of CO_2 emissions (Johnson, 2006). In 2006, Hull erected a second, much larger municipal wind turbine, projected to save the city another half a million dollars annually. Officials from a host of other municipalities and colleges are exploring Hull's successes, constructing turbines of their own, commissioning local wind studies, and working with wind power advocates to assess investment opportunities, and possible turbine sites (Ebbert, 2006). Hull and other communities are seeking expertise and financial support for wind power investments offered by wind power advocates, state renewable portfolio standards, public benefits funds, and university programs (Ebbert, 2006; Johnson, 2006; Skolfield, 2006).

CIVIL SOCIETY

An expanding regional network of environmental NGOs, the New England Climate Coalition, has coalesced around climate change action.[5] This network includes Public Interest Research Groups, state chapters of Clean Water Action and the Sierra Club, dozens of local environmental groups, and relatively new NGOs focused on climate change such as Clean Air—Cool Planet and Environment Northeast. Coalition members prepare well-researched assessments and policy reports, and coordinate lobbying and public awareness campaigns (Selin and VanDeveer, 2005). Many NGO campaigns invoke expected negative effects of climate change on iconic aspects of New England life, such as fall foliage, maple syrup production, and skiing. Grant making foundations with headquarters or offices in the region are working closely with NGOs on their many activities.

"An expanding regional network of environmental NGOs, the New England Climate Coalition, has coalesced around climate change action.

Many of the region's universities are expanding their climate change initiatives (Levine, this volume). Working with the New England Board of Higher Education, NECP officials also sponsor a university-outreach program. To date, more than 130 universities in both Canada and the United States have joined the program, which seeks to challenge universities to initiate climate action measures and increase climate change related research and education efforts on campuses. As part of the program, universities are encouraged to complete and release GHG emission inventories, to stabilize and reduce their GHG emissions, and to share their experiences with each other and with public officials, NGOs, and citizens. To do these things, universities are encouraged to use a "toolkit" supplied by Clean Air—Cool Planet.[6]

Developments in climate change science and politics also receive growing coverage in major regional newspapers such as the *New York Times* and the *Boston Globe*, together with national magazines. The *New York Times* in particular has devoted much attention to efforts by the Bush administration to play down

or alter scientific data on anthropogenic influences on the global climate system. Many of the region's newspapers closely follow RGGI and other major climate and energy policy developments, as well as political and legal developments associated with the lawsuits filed by state attorneys generals against the federal government for its unwillingness to regulate CO_2 emissions. Editorials in the region's newspapers are largely supportive of the various climate change policy developments at regional, state, and local levels.

THE POTENTIAL AND LIMITS OF REGIONAL ACTION

A network of civil servants has been an important driving force behind climate policy initiatives in the Northeast (Selin and VanDeveer, 2005). These networked "policy entrepreneurs," as Barry Rabe might call them, frame climate change issues in regional and local terms and exchange scientific, technical and political information in ways that help to shape policy choices of elected officials and develop more progressive climate change policy across the region. These policy efforts are driven by a combination of factors, including an acceptance of the science of human driven climate change, concerns about regional vulnerabilities to a changing climate, efforts to protect the long-term viability of local economies, and a sense of responsibility to act in the face of lagging federal climate policy (Selin and VanDeveer, 2005; 2006).

Policy developed under the auspices of the NEG-ECP Climate Change Action Plan has reduced CO_2 emissions and engendered the construction of institutional and human capacities necessary for continued political and social action on climate change. States have also adopted individual climate change action plans and policies, such as regulating CO_2 emissions from oil and coal-fired power plants and adopting renewable portfolio standards. Under RGGI, states are attempting to launch a CO_2 emissions trading scheme and attorney generals of several states are collectively suing the federal government over its refusal to regulate CO_2. In addition, many cities and towns across the Northeast are developing climate policy and setting goals of reducing GHG emissions at the municipal level. The regional NGO community has greatly intensified its efforts on climate change policymaking and public outreach over the past couple of years.

Because Northeastern states emit GHG emissions at levels similar to many medium-sized European and developing countries, GHG mitigation efforts in these states are important in an international context (Selin and VanDeveer, 2005). Yet the impacts of GHG mitigation action in the Northeast should not be exaggerated. State actions taken to date are not likely to meet short-term GHG emissions reduction targets, which in themselves are modest. In other words, the 2010 and 2020 emissions reduction goals of the NEG-ECP Climate Change Action Plan cannot be met without further efforts to reduce emissions from the two major sources of GHG emissions, transportation and energy. Similarly, while RGGI may prove to be an important institutional precedent, it will not, in itself, achieve the emission reduction goals adopted by participating states.

"Because Northeastern states emit GHG emissions at levels similar to many medium-sized European and developing countries, GHG mitigation efforts in these states are important in an international context.

Addressing emissions from the transportation sector more aggressively poses a major policy challenge for the Northeastern states, as well as the rest of the United States and Canada. Though state officials in the region frequently discuss transportation issues, little policy change so far has been achieved that is likely to

substantially impact GHG emissions from transportation. In part, state officials are awaiting the outcome of California's current efforts to regulate CO_2 emissions from vehicles, especially as some Northeastern states are legally mandated to adopt California vehicle emission standards. The adoption of new California standards would be one important step to reduce transportation emissions in the Northeast, but additional measures will likely be required to effectively bring down GHG emissions from this sector.

Although the many CCP members across the Northeast are initiating important policy efforts on climate change mitigation, municipalities are also discovering that reducing GHG emissions can be challenging. For example, Cambridge, Mass., aims to reduce its emissions to 20 percent below 1990 levels by 2010, which would represent an annual reduction of almost 500,000 tons of CO_2 (City of Cambridge, 2002). Yet data released in 2004 showed that Cambridge's GHG emissions are up 27 percent from 1990 levels (Cambridge Climate Action Protection Committee, 2004). While emissions from the residential sector were down by 25 percent from 1990 levels, commercial and industrial emissions grew by 63 percent from 1990 levels. Transportation emissions also increased by 22 percent between 1990 and 2003.

In addition, there are, of course, opponents to expanding regional climate change policy and action in the Northeast. Some policymakers and analysts oppose the NEG-ECP Climate Change Action Plan and developing state climate policy on principle. For example, U.S. Senator John Sununu (R-N. H.) is a consistent skeptic of the science behind climate change, while researchers at the Maine Public Policy Institute refute data pointing to an increase in human influence over the climate, declaring that higher energy prices would be "death to New England" (Reisman, 2003). Massachusetts and Rhode Island elected not to sign RGGI's Memorandum of Understanding in part because of political pressure from public and private sector actors opposing the idea of a regional cap and trade scheme.

Nevertheless, the regional, state and local initiatives discussed above, and the well-networked climate policy advocates associated with them, are potentially influential well beyond the Northeastern region and/or the direct effect on GHG emissions from the rather modest set of mitigation policies enacted so far. The initiatives outlined above, if perceived as even moderately successful,

> "These many state-level initiatives may help to expand markets for energy-efficient products and renewable energy, as well as engender policy learning and diffusion across state actors and borders.

will be invoked by climate change policy advocates across the continent as evidence that measured climate change policy is possible while maintaining (and possibly even improving) the competitiveness of the local economy. Thus, regional groups of leading states, such as those on the West Coast or around the Great Lakes, may take up similar climate change policy planning and goal setting efforts (Rabe, this volume).

RGGI participants report extensive contact with public officials in other U.S. states and Canadian provinces regarding procedures and substantive elements of RGGI. There are no formal obstacles preventing others from joining RGGI, and additional participants need not be geographically contiguous with current RGGI states. RGGI could also be extended to include GHG emissions sources besides power-generating facilities. Moreover, just as the existing U.S. national SO_2 and NO_x trading programs were substantially shaped by early action in the Northeast, RGGI may have a significant influence on any future federal CO_2-trading scheme, especially if its geographical and regulatory scope were to be expanded. In fact, a central justification for RGGI among regional officials and climate policy advocates is that the program is likely to influence future federal climate change policy developments.

To date, the Eastern Canadian provinces have generally lagged behind the Northeastern U.S. states when it comes to developing and implementing regional and local level

climate change policy beyond federal mandates. The provinces have often adopted a wait and see stance with respect to the formulation of a national Canadian climate policy (Stoett, this volume), whereas the states in the Northeast have been more proactive in their desire to take action in what they see as a federal policy vacuum. These many state level initiatives may help to expand markets for energy-efficient products and renewable energy, as well as engender policy learning and diffusion across state actors and borders. Climate policy advocates in the region are also actively trying to generate and diffuse norms that policy and behavior that reduce GHG emissions are "better" than those that engender increases.

Addressing climate change ultimately requires the involvement of the public, private, and civil sectors—both individuals and institutions—working multiple levels of governance from local to global. Climate governance ultimately requires public, private and civil society sector individuals and institutions across various levels of organizations from local to global. In the North American Northeast, state and local officials, NGOs, universities, and firms are actively engaged in public and private debates about effective and efficient ways to respond to the challenges posed by climate change mitigation and adaptation. A growing number of the region's public and private sector actors are moving ahead on climate change action in the absence of federal policy, but they also call for more serious and effective federal political action and economic support for climate change mitigation and adaptation. Local politicians and officials acknowledge that supplementary federal policy is necessary to substantially expand on the policy momentum that has been building in the region since the late 1990s, and to significantly impact national GHG emissions.

NOTES

1. For more on the NEG-ECP climate change program, see http://www.neg-ecp-environment.org.
2. For more on Cape Wind, see http://www.capewind.org.
3. For extensive documentation on the RGGI process and the content of various modeling and stakeholder involvement exercises, see the RGGI website: http://www.rggi.org.
4. For more on the U.S. Green Building Council, see http://www.usgbc.org.
5. For information and a list of coalition members, see http://www.newenglandclimate.org.
6. See http://www.cleanair-coolplanet.org/toolkit.

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NAFTA as a Forum for CO_2 Permit Trading?

MICHELE M. BETSILL

The carbon market is one of the world's fastest growing markets, with trade volume increasing from 94 million metric tons in 2004 to 800 million metric tons in 2005 at an approximate value of €9.4 billion (Hasselknippe and Røine, 2006).[1] A 2003 study identified more than 45 greenhouse gas (GHG) trading systems worldwide in operation or under development, including systems at the sub-national, national, and transnational levels involving both the public and private sectors (Hasselknippe, 2003).[2] This reflects a general trend toward multi-level governance on the issue of climate change, which in turn raises questions about what level of social organization is most appropriate for particular governance tasks (Betsill and Bulkeley, 2006; Young, 2002).

This paper evaluates a proposal to establish a North American emissions trading system within the NAFTA regime. There has been some discussion within the North American Commission for Environmental Cooperation (CEC), NAFTA's environmental organ, about establishing a CO_2 permit trading system to mitigate the environmental impacts of electricity generation. North America consumes half of all electricity produced and consumed in the industrialized world, and electricity generation is a significant source of CO_2 emissions in Canada, the U.S., and Mexico (Dukert, 2002; Rowlands, this volume). Following a brief introduction to the CEC discussions, this paper addresses three sets of issues related to establishing a NAFTA-wide CO_2 permit trading system in the CEC, with particular focus on its implications for climate protection: the institutional context, design elements, and overlap with other trading systems. In the final section, I question the wisdom of establishing a CO_2 permit trading system within the NAFTA regime to address the problem of climate change.

THE CEC AND EMISSIONS TRADING

The CEC is the primary mechanism for addressing environmental concerns within the NAFTA regime. It was created by the North American Agreement on Environmental Cooperation (NAAEC), a side agreement negotiated at the time the NAFTA regime was created in order to appease environmental groups concerned about the ecological impacts of increased trade in North America. The NAAEC, and its related institutions, seek to manage the economic growth associated with trade liberalization in an environmentally sustainable way; it also allows for action on the environment beyond trade. CEC discussions related to mitigating CO_2 emissions are in their infancy, and it is important to acknowledge that climate change is by no means at the top of the CEC agenda. While climate change has been addressed directly on a limited basis, climate-related issues have been taken up in several CEC program areas (Betsill, forthcoming). The CEC Council (consisting of environment ministers from each Member State) has passed

two climate-related resolutions calling for coordination of methodologies for GHG emissions inventories and forecasts (CEC, 1995; CEC, 2001).

The most recent discussions on climate change are linked to concerns about the environmental impacts, especially related to air quality, of an increasingly integrated North American electricity market (CEC, 2002). Of course, discussions of air quality and the electricity sector are not divorced from the problem of climate change since electricity generation is a significant (and growing) source of GHG emissions in each NAFTA Member State, accounting for 39 percent of all CO_2 emissions in the U.S., 22 percent in Canada and 30 percent in Mexico (Miller and Van Atten, 2004). The North American electricity market has experienced rapid change over the past decade in the form of increased trade and rising demand, largely due to the general trend of trade liberalization and regional convergence in competitiveness and trade policy (CEC, 2002; Dukert, 2002; McKinney, 2000). Market integration is likely to continue and generation capacity is expected to increase to meet rising demand (CEC, 2002; Ferretti, 2002). Ultimately, a number of factors will determine the implication of market integration and increased generation capacity on North American GHG emissions, including location, fuel choice, price, infrastructure, market access, grid access, and regulations (CEC, 2002; Dukert, 2002; McKinney, 2000; Mumme and Lybecker, 2002; Rowlands, this volume).

In 2000, the CEC launched an initiative to address the challenge of ensuring "an affordable and abundant supply of electricity without compromising environmental and health objectives" (CEC, 2002). Specifically, the CEC examined the environmental aspects of the regional electricity market and prospects for green electricity.[3] In the final report, "Environmental Challenges and Opportunities of the Evolving North American Electricity Market," the initiative's advisory board made four recommendations specific to climate change and emissions trading:

- Develop a regional GHG emissions inventory;
- Establish a framework for a regional GHG emissions trading regime;
- Demonstrate that carbon trading can generate resources for developing countries (e.g., Mexico); and
- Develop programs to stimulate investment in clean and renewable energy production (especially in the United States) (CEC, 2002).

In 2002, the CEC Council agreed to include some items from the electricity report in the 2003 CEC Air Quality Work Plan, including comparative studies of North American air quality management standards, regulation and planning, compatibility of standards for construction and operation of electricity generation facilities, and opportunities for emissions trading (JPAC 2003). In 2004, the CEC issued a report detailing 2002 sulfur dioxide (SO_2), nitric oxides (NO_x), mercury and CO_2 emissions from North American power plants as a result of a 2001 Council Resolution and the "Environmental Challenges" report (Miller and Van Atten, 2004).

The following sections address three sets of issues related to the development of a CEC-based CO_2 permit trading system: the institutional context, design elements, and overlap with other trading systems.

THE INSTITUTIONAL CONTEXT

Reaching a political agreement to control emissions is a key factor in the success of any emissions trading system (Aulisi et al., 2005; Hasselknippe, 2003). This section considers the ability of the CEC to facilitate agreement among its Member States to control CO_2 emissions. I examine the specific rules and structures of the CEC and the broader NAFTA regime, and conclude that reaching political agreement on controlling CO_2 emissions depends on linking CO_2 to broader air quality and energy concerns rather than climate change. Moreover, political agreement must rest on a core commitment to NAFTA's trade liberalization objective.

The CEC

The CEC's capacity to facilitate political agreement on controlling CO_2 emissions is constrained by the absence of common interests on climate change. NAFTA Member States have distinct domestic approaches to climate change, which have developed independently of one another. Moreover, Canada, the United States and Mexico have different levels of economic development, which has also shaped their respective responses to climate change. The United States focuses on reducing the carbon intensity of its economy through voluntary programs (U.S. Department of State, 2002). The Canadian system consists of government regulations, including a domestic emissions trading system, and strategic investment designed to achieve its Kyoto target and to become a world leader in developing clean technology (Government of Canada, 2005). Mexican climate policy has focused on developing an emissions inventory, mitigation projects in the forestry and energy sectors, and attracting investment through the Clean Development Mechanism and Joint Implementation program under the Kyoto Protocol (Instituto Nacional de Ecología, 2001; see also Pulver, this volume). Canada and Mexico are both parties to the Kyoto Protocol (the United States rejected the Kyoto Protocol in March 2001), although only Canada has a binding international commitment to reduce its GHG emissions. The CEC, as an intergovernmental body, has no authority to promote policy coordination unless Member States concede the necessity of doing so, which seems unlikely given the different national approaches to climate change and resistance on the part of the United States (Stevis and Mumme, 2000).

In contrast, NAFTA Member States do appear to have common interests related to air quality and energy supply as reflected in the CEC's programs and projects. The Environment, Economy, and Trade Program seeks to understand the relationship between trade and the environment, encourage trade in environmental goods and services, and partner with financial institutions on issues of finance and the environment. This program includes projects on renewable energy in the context of greening trade, green procurement programs, and identifying the environmental implications of the North American electricity market. The aim of the Pollutants and Health Program is "to establish cooperative initiatives on a North American scale to prevent or correct the adverse effects of pollution on human and ecosystem health" (CEC, 2005). One project under this program aims to facilitate coordination among air quality management agencies in North America.

In this context, the CEC may be able to facilitate political agreement on controlling CO_2 emissions to the extent that CO_2 is linked to air quality and energy issues rather than climate change. Regional organizations, which typically address many issues simultaneously, can promote the development of shared interests by linking a particular issue to other issues addressed within the organization that may be of greater concern to one or more Member States (Axelrod and Keohane, 1986; Levy, Keohane, and Haas, 1995). Indeed, we see this sort of issue linkage in the CEC where CO_2 is often treated like other air pollutants produced by utilities.

NAFTA

Another important component of the institutional context concerns the relationship between a CEC-based CO_2 permit trading system and the broader NAFTA regime, where trade liberalization is the primary objective. Consistent with the NAFTA treaty, the CEC rests upon a core set of neoliberal economic assumptions—trade will increase prosperity, environmental protection is an important part of prosperity, and trade will create greater resources for environmental protection—and works to promote environmental sustainability in ways that are consistent with NAFTA's goal of trade liberalization (Ferretti, 2002). On the general relationship between the environment and trade in the NAFTA context, Stevis and Mumme (2000) contend the environment plays a secondary role. It is therefore not surprising that emissions trading has emerged as a preferred policy option within the CEC for mitigating the environmental impacts of electricity generation since market-based instruments such as emissions trading are seen to offer a win-win solution to environmental problems by providing economic incentives and flexibility.

At the same time, the fact that a CEC-based CO_2 permit trading system would be nested within the broader NAFTA regime means that it would need to be consistent with NAFTA's trading rules in general and rules specific to the electricity sector in particular (Horlick, Schuchhardt, and Mann, 2002). Russell (2002) identifies a number of potential conflicts between a NAFTA-wide emissions-trading system and trade and investment provisions in the NAFTA treaty. For example, would tradable emissions units (TEUs) be treated goods and therefore subject to Chapter 3 provisions on national treatment and market access? Would purchasing TEUs from entities in other countries fall under Chapter 11 rules regarding investment? Emissions allowance units could be considered as subsidies subject to extra duty when transferred between countries. Is trade in TEUs an activity linked to the procurement of energy goods and services? Finally, could activities involved in the trading system be viewed as trade restrictions? These issues must be given careful consideration in any future discussions of a CEC-based trading system.

DESIGN ISSUES

Framing the problem of CO_2 emissions as an issue of air quality and energy has implications for the design of a CEC-based permit trading system. The design of an emissions trading system affects its environmental integrity and economic efficiency. This section analyzes key design elements involving coverage (gases and sectors) and targets (caps and allocation), and identifies issues that may arise in the context of designing a CEC-based CO_2 permit trading system. I find several instances in which the goals of environmental integrity and economic efficiency are likely to come into conflict. Given NAFTA's focus on trade liberalization, the CEC may be likely to resolve such conflicts by giving priority to economic efficiency. I also argue that some design choices could render a CEC-based CO_2 permit trading system meaningless for climate change.

Coverage

Trading systems that include a variety of gases give participating installations the flexibility to reduce emissions where costs are lowest. Roughly half of all CO_2 permit trading systems include a basket of six GHGs, which makes sense in addressing the problem of climate change since each has a warming potential (Hasselknippe, 2003). At the same time, monitoring and verifying emissions reductions for several gases can be difficult, so many systems such as the Regional Greenhouse Gas Initiative (RGGI) only include CO_2. A CEC-based trading system would likely include only CO_2 since CO_2 is the only GHG that has been monitored to date on a cross-national basis. In addition, reaching agreement among Member States to include a broader range of GHGs could be difficult given that the CEC views CO_2 as an air pollutant rather than a contributor to climate change.

Of course, this framing also makes it likely that a CEC-based system would include other air pollutants that are monitored cross-nationally, such as sulfur dioxide, (SO_2), nitric oxides (NO_x) and mercury. As noted above, including several gases is economically desirable because facilities can choose to reduce emissions of gases where the costs are lowest. However, by including non-GHGs, a CEC-based system may have little impact on the problem of climate change if participating facilities routinely choose to reduce SO_2, NO_x or mercury emissions rather than CO_2. One way to achieve environmental integrity in terms of climate protection is to set emissions caps on a gas-by-gas basis. However, this would reduce the flexibility that comes with multi-gas coverage, potentially raising compliance costs.

Ideally, a CO_2 permit trading system should have broad participation from a variety of sectors and emissions sources, since sources are highly diffuse across the economy and broad participation allows for greater opportunity to identify low-cost reduction options (Aulisi et al., 2005). At the same time, broad participation may be administratively or politically prohibitive. The vast majority of CO_2 permit trading systems focus on large final emitters (e.g. power plants), which tends to keep the number of facilities at a manageable level while also covering a relatively high percentage of emissions (Christiansen and Wettestad, 2003; European Commission, 2004; Hasselknippe, 2003). Discussions within the CEC have focused on the electricity generation sector. This seems to be an appropriate compromise given its central role in producing CO_2 emissions as well as other air pollutants. Another related issue is whether participation should be mandatory among facilities in the

covered sectors. Participation in a CEC-based trading system would likely be voluntary given the Bush administration's opposition to regulating CO_2 emissions at U.S. facilities. Ausili et al. (2005) argue that allowing facilities to voluntarily join a trading system creates a problem of "adverse selection" whereby only those firms whose emissions are likely to decrease anyway join in thereby reducing the demand for (and thus price of) credits.

Many allowance trading systems let credits purchased from project offsets be included (Hasselknippe, 2003). Allowing offset credits is one way of encouraging participation in trading schemes by developing countries since they are likely to attract investment in offset projects. In North America, allowing project credits to some extent could be a particularly attractive option for Mexico whose domestic focus has been on situating itself to provide this service under the Kyoto Protocol. However, the problem with offset credits is that they fall outside the emissions cap and can thus lead to greater emissions, thereby jeopardizing the environmental integrity of the trading system (Aulisi et al., 2005).

Targets

Two key tasks in setting up a permit trading system are setting the cap, or the upper limit on emissions of covered gases, and allocating emissions allowance among facilities in the selected sector(s). Caps can be expressed in a variety of ways: absolute tons of emissions, percentage of emissions from a base year, or intensity-based emissions standards (Hasselknippe, 2003). In systems that include a number of gases, targets may reflect an overall cap on the emissions of all gases combined or they can be set on a gas-by-gas basis. As mentioned above, if a CEC-based CO_2 permit trading system is to be climate-relevant, it must have a gas-by-gas cap. However, setting a CO_2 cap in the North American context is likely to be difficult as there is no clear basis for doing so. NAFTA Member States have very different domestic approaches to climate change, and only Canada has a binding target to reduce emissions under the Kyoto Protocol. As discussed above, the CEC has limited authority over its Member States and is thus unable to impose targets without the consent of Member States. Moreover, the scientific rational for setting a CO_2 target linked to air quality is weak.

Once a target is set, emissions allowances must be allocated among participating facilities, which can be done by a central authority (e.g., the CEC) or by jurisdictions within the trading system (e.g., national governments) thereby enhancing flexibility. The latter option is most likely in the North American context given the CEC's weak authority over Member States. Each jurisdiction could then decide how to allocate allowances. Under grandfathering, allowances are distributed to participating facilities based on historical emissions and/or production levels. Alternatively, facilities can be required to purchase allowances through an auction (Aulisi et al., 2005; Christiansen and Wettestad, 2003). Auctioning allowances is seen to be more economically efficient and can be useful for early price recovery. At the same time, auctioning can be politically contentious. In the initial stages, grandfathering is less likely to mobilize opposition from covered facilities and may enhance prospects of getting a system up and running (Christiansen and Wettestad, 2003). However, a potential weakness of the grandfathering approach recently became apparent when carbon credits within the European system lost 50 percent of their value. Several EU countries announced that their 2005 emissions were smaller than expected, which in turn reduced future demand for credits. According to *The Economist* (May 6, 2006), this reflects "industry's success in getting itself allocated more permits than actual emissions warranted when the scheme was launched."

"Setting a CO_2 cap in the North American context is likely to be difficult as there is no clear basis for doing so.

OVERLAP WITH OTHER CO_2 PERMIT TRADING SYSTEMS

The design of a CEC-based trading system also has implications for overlap with other CO_2 permit trading systems. In recent years, CO_2 permit trading systems have emerged at a variety of levels of social organization in both the public and private spheres, reflecting a general trend toward multi-level governance on the issue of climate change (Betsill and Bulkeley, 2006). In a situation of multi-level governance, governance arrangements may overlap both horizontally (across space) and vertically (across levels of social organization), and synergies between overlapping institutions cannot be assured (Berkes, 2002; Young, 2002). Young (2002) highlights the need to "ensure that cross-scale interactions produce complementary rather than conflicting actions." This section considers overlap between a CEC-based CO_2 permit trading system and seven allowancetrading systems in operation, under development, or proposed in North America and Europe as of February 1, 2006 (see Table 1).[4] I identify two areas of potential conflict: regulation of electricity generation and the ability of Canada to meet is commitment under the Kyoto Protocol.

TABLE 1: GHG Allowance Trading Systems in North America and Europe

TRADING SYSTEM	STATUS	DESCRIPTION
Canadian Large Final Emitters (LFEs)	To start in 2008	Part of Canadian government's comprehensive planning for honoring its Kyoto Commitment. Sets CO_2 reduction targets for 700 companies accounting for nearly 50 percent of Canada's emissions
Chicago Climate Exchange	Operational (pilot phase 2003-2006)	Voluntary trading program for companies, municipalities and universities in Canada, the United States and Mexico.
EU Emissions Trading System (ETS)	Operational (as of 1 January 2005)	Part of Kyoto compliance system; includes CO_2 emissions from more than 12,000 installations in the energy and industrial sectors
New England Governors/ Eastern Canadian Premiers (NEG/ECP)	Proposed in 2001	Part of NEG/ECP climate change program to reduce GHG emissions to 1990 levels by 2010 and 10 percent below by 2020. Exploring options for cross-border emissions trading, perhaps through RGGI.
New Hampshire	Operational (begun in 2002)	Mandatory caps on CO_2, SO_2, NOx and mercury emissions for state's power plants. Trading allowed in order to meet CO_2, SO_2 and NOx targets.
Regional Greenhouse Gas Initiative (RGGI)	Planned (proposed in 2003)	Establish a common CO_2 permits trading system from Maryland to Maine covering power plants.
U.S. Climate Stewardship Act	Legislation introduced the Senate in 2005	Proposal to require all entities emitting more than 10,000 tons of CO_2 equivalent a year in the electricity, transportation, industry and commercial sectors to stabilize emissions at 2000 levels over 2010-2015 period. Could use trading to meet target.

Sources: Chicago Climate Exchange, 2004; Government of Canada, 2005; New England Governors/Eastern Canadian Premiers, 2001; Pew Center on Global Climate Change, 2006; RGGI, 2005; Selin and VanDeveer, 2005.

ELECTRICITY GENERATION SECTOR

CO_2 permit trading systems in North America and Europe vary in terms of the economic sectors covered and whether participation by entities within those sectors is mandatory or voluntary (Table 2). Despite this variation, it is notable that the electricity sector is subject to regulation in the Canadian, EU ETS, New Hampshire, RGGI and Climate Stewardship Act systems and is the likely target of a CEC-based emissions trading system. In the case of the New Hampshire and RGGI systems, the overlap produces complementarity because the RGGI is explicitly designed to help states meet their specific goals (Figure 1). However, overlap between these systems and a CEC-based trading system could result in conflict if power generation facilities in Canada and the United States find themselves subject to conflicting regulations (Figure 2).

When overlapping institutions come into conflict, there may be incentives for actors to shift political authority to the venue most likely to promote a favorable policy (Alter and Meunier, 2006; Gerber and Kollman, 2004). Owners of North American power-generation facilities may prefer to shift primary authority to a CEC-based system for two reasons. First, the CEC jurisdiction would cover all power plants in North America, which would lessen the risk that some facilities may gain a competitive advantage because they face no or less restrictive regulations. Second, it is possible that a CEC-based program rationalized in terms of air quality would set a less stringent CO_2 reduction target than the other systems, which are justified in terms of mitigating the threat of climate change.

Canada and the Kyoto Protocol

It is also important to consider potential overlap between a CEC-based trading system and the international climate change regime. Analyses of the global carbon market frequently distinguish between Kyoto

TABLE 2: Participation in Emission Trading Systems

SYSTEM	PARTICIPATION
Canadian LFEs	Mandatory participation for large final emitters in the mining and manufacturing, oil and gas, and thermal electricity sectors
Chicago Climate Exchange	Voluntary participation for corporations, municipalities, universities, and non-profit organizations
EU ETS	Mandatory participation for combustion plants; oil refineries; coke ovens; iron and steel plants; cement, glass, lime, brick and ceramics factories; and pulp and paper.
NEG/ECP	No data
New Hampshire	Mandatory participation for fossil-fuel fired power plants
RGGI	Voluntary* participation for power generation facilities
Climate Stewardship Act	Mandatory participation for electricity, transportation, industry and commercial sectors

*Depends on the situation within a member state, which can require mandatory participation.

FIGURE 1

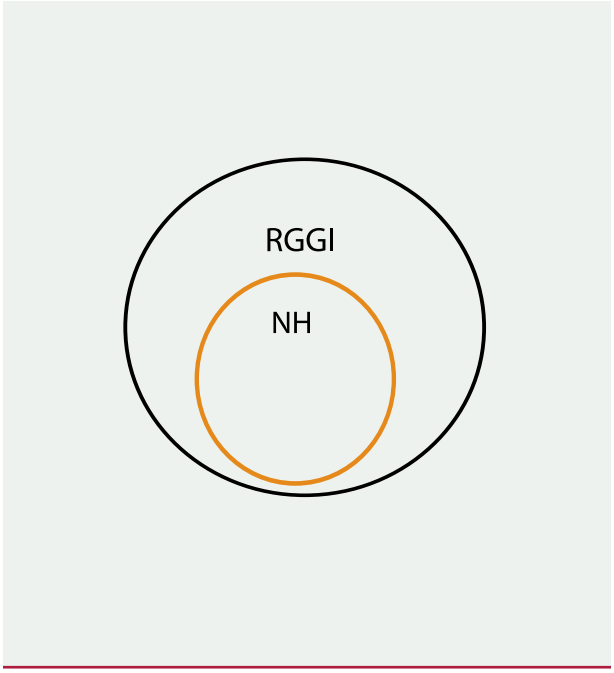
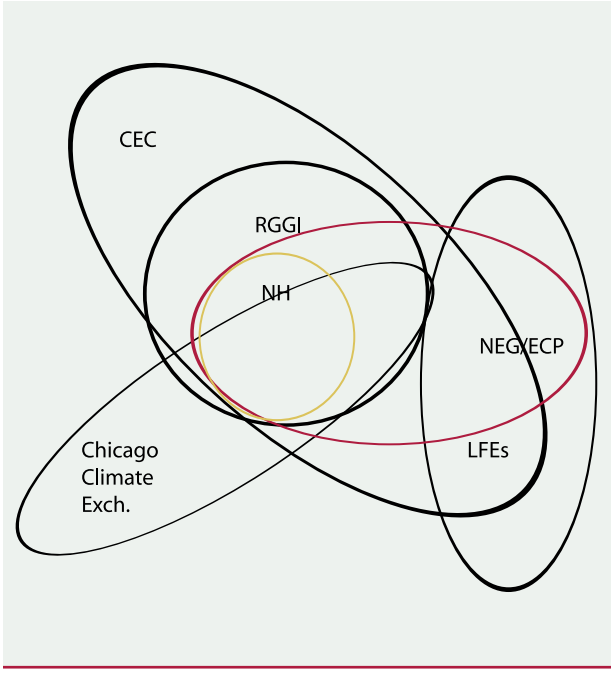


FIGURE 2



and non-Kyoto systems, based on the system's linkages to the Kyoto Protocol (Lecocq and Capoor, 2005). The Canadian LFE and EU ETS systems are clearly nested within the Kyoto system; they are designed to facilitate compliance with Kyoto emissions reduction commitments. Two other systems in North America interact with the international climate change regime as well. The NEG/ECP *Climate Change Action Plan 2001* identifies as its long-term goal the need to "reduce regional GHG emissions sufficiently to eliminate any dangerous threat to the climate" and notes that this goal "mirrors that of the United Nations Framework Convention on Climate Change" (New England Governors/Eastern Canadian Premiers, 2001; see also Selin and VanDeveer, 2005). The U.S. *Climate Stewardship Act* acknowledges the United States' obligation, as a party to the UNFCCC, to stabilize its GHG emissions at 1990 levels (although it establishes an alternative target date).

A CEC-based trading system is difficult to classify according to the Kyoto/non-Kyoto distinction. One the one hand, a CEC-based emissions trading system would not be driven by compliance with the Kyoto Protocol since not all of its Member States have Kyoto targets, and it is rationalized more broadly in terms of air quality and energy issues. On the other hand, Canada does have an obligation to reduce its GHG emissions six percent below 1990 levels under the Kyoto Protocol (see Stoett, this volume). Due to market forces in North America, Canadian firms have become major suppliers of oil and natural gas to the Unites States, leading to increased emissions and higher Kyoto compliance costs (Charnovitz, 2003; Page, 2002; Zhang, 2003). This puts Canada in a difficult situation. The EU ETS, as the model for the Kyoto trading system, can be linked to systems in countries that have ratified the Kyoto Protocol through mutual recognition of allowances (Christiansen and Wettestad, 2003). However, under these rules, credits obtained from U.S. firms (located in a non-Party state) would not be recognized internationally and thus could not be used to meet Canada's Kyoto commitment. In other words, institutional interplay between a CEC-based trading system and the international climate change regime leads to a conflict that could undermine Canada's ability to comply with its Kyoto target.

CONCLUSION

This paper has examined several issues related to a proposal to establish a NAFTA-wide CO_2 permit trading system within the CEC. I find that the political foundation for such a system depends on framing CO_2 as an issue related to air quality and energy rather than climate change and relying on policies that do not threaten the goal of trade liberalization. In addition, the design of such a system will give rise to conflicts between economic efficiency and environmental integrity, with economic efficiency likely to prevail given NAFTA's trade liberalization goal. Finally, I contend that overlap between a CEC-based CO_2 permit trading system and other trading systems in North America and Europe could result in conflicts over the regulation of the electricity generation sector and with the international climate change regime.

As noted in the introduction, emissions trading illustrates the increasingly multilevel nature of climate governance. In systems of multilevel governance it is important to allocate governance tasks to the most appropriate level(s) of social organization. In North America, I find little value-added in establishing a CO_2 permit trading system at the regional (inter-state, continental scale) level as a strategy for addressing climate change. Because of its intergovernmental nature, the CEC is unable to promote harmonization of climate policy among Member States without their consent. Instead, it must address climate change indirectly by linking the problem to broader issues of air quality and energy. While this may be a politically useful strategy, it could dilute the impact of the trading system on climate change if CO_2 emissions are not considered separately from other air pollutants. In addition, the fact that the CEC is nested within the broader NAFTA regime means that conflicts between environmental integrity and economic efficiency are likely to be resolved in favor of economic efficiency so as to be consistent with the goal of trade liberalization. Finally there is danger that a CEC-based CO_2 permit trading system could undermine the effectiveness of trading systems at other levels of social organization.

This is not to say that NAFTA has no role in governing climate change. As cross-border, climate-related activities intensify, NAFTA institutions are likely to face greater pressure to address climate change in the future. The ongoing challenge will be to identify appropriate tasks that will not undermine efforts to mitigate GHG emissions in other spheres and tiers of governance.

> "In North America, I find little value-added in establishing a CO_2 permit trading system at the regional (inter-state, continental scale) level as a strategy for addressing climate change.

NOTES

1. In April 2006, the value of carbon credits within the European Emissions Trading Scheme decreased by half. The long-term implications of this for the global carbon market are unclear (*The Economist*, May 6, 2006).

2. Trading systems are typically categorized as either allowance or credit systems. Allowance trading system (also referred to as "cap and trade" or permit systems) involve setting an upper limit on emissions levels, distributing emissions allowances among participants in the system and letting participants trade allowances among themselves in order to meet their respective commitments. Credit (or project-based) trading systems engage in the purchase and transfer of emissions credits derived from specific projects. The permit trading system discussed in this paper is an example of an allowance trading system.

3. The process was overseen by an advisory board and involved the production of several working papers and three public events. Copies of these papers and information on the public events are available at http://www.cec.org/programs_projects/other_initiatives/electricity/index.cfm?varlan=english.

4. The analysis draws on a framework developed by Selin and VanDeveer (2003) to analyze governance linkages, which consist of "structural connections between components of particular international institutions." I rely on data from primary and secondary documents for each trading system as well as databases compiled by the International Emissions Trading Association and the Pew Center on Climate Change.

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Climate Politics in Mexico in a North American Perspective

SIMONE PULVER

The evolution of climate politics in North America has been central to shaping the course of climate action at the international level. The federal, state, and even city-level climate policy decisions of the United States—the largest historical and per capita emitter of greenhouse gases—have both significant biophysical and political consequences. Likewise, Canada, through its 2002 decision to ratify the Kyoto Protocol and its more recent acknowledgment that it will not be able to meet its Kyoto target, is playing an active role, first bolstering and then weakening the Kyoto regime. As a result of the prominent role played by its northern neighbors, climate policy in Mexico is often overlooked.

The premise for this briefing paper is that Mexico's political prominence in the climate arena is sure to increase over the next decades. First, regardless of the future of the Kyoto regime, international climate policy is likely move in the direction of binding greenhouse gas emissions reductions targets for developing countries. As the only two members of the OECD that did not take on targets under the Kyoto Protocol, Mexico and South Korea will be at the forefront of negotiations regarding developing country targets. Second, while the case of Mexico is certainly not representative of all developing countries, understanding the dynamics of climate politics in Mexico can be a first step to building of base of knowledge of climate politics in non-Annex 1 countries. Third, given the extensive economic integration and institutional basis for collaboration, the North American region is a likely site for piloting a climate regime that integrates developed and developing economies.

> "As one of only two members of the OECD that did not take on targets under the Kyoto Protocol, Mexico will be at the forefront of negotiations regarding developing country targets.

Focusing on Mexico also contributes to a discussion of North American climate politics by highlighting some commonalities across borders (please see Table 1 for an overview of climate and energy statistics for Mexico, the United States, and Canada). In particular, Mexico and Canada may have more in common on the climate issue than first

TABLE 1: Key Energy and Climate Statistics for Mexico, Canada, and the United States

	MEXICO	CANADA	UNITED STATES
*Population——2006	107 million	33 million	298 million
*GDP PPP——2005 (US$)	$1.068 trillion	$1.08 trillion	$12.41 trillion
*GDP official fx rate——2005 (US$)	$669.5 billion	$1.023 trillion	$12.47 trillion
*GDP per capita——2005 (US$)	$10,100	$32,900	$42,000
CO_2 Emissions——1999 (million metric tons)	358	489	5,584
CO_2 emission/capita——1999 (metric tons per person)	3.7	16.0	19.9
Total energy consumption——1999 (metric tons of oil equivalent)	149 million	241 million	2.2 billion
Energy Intensity/GDP PPP——1999 (metric tons of oil equivalent/US$)	169	314	264
Vehicles/capita——1998	0.14	0.56	0.77

Sources: (CIA 2006; WRI 2003

appears (Rowlands, Stoett, this volume). Both are oil-producing countries, whose economies are relatively energy inefficient and for whom the United States is the primary export market (Belausteguigoitia and Lopez-Bassols 1999). Both countries are potentially very vulnerable to the effects of climate change; Mexico due to widespread poverty and high levels of biological diversity, and Canada because of the vulnerability of social and ecological communities in the Arctic due to warming. Finally, in both countries, domestic climate policy choices are likely to be influenced by the domestic and international climate policy choices of the United States.

The core of this briefing paper is a detailed, historical analysis of Mexican climate change politics.[1] I structure my discussion of the evolution of Mexican climate politics around developments in four societal arenas (scientific/research community, government, industry, and civil society), and I highlight four key features of the political terrain that have shaped the evolution of climate change politics in Mexico. First, the initial agenda for action on climate change was set by climate scientists in the national university and by bureaucrats in the national environmental ministry. Their early control of the issue had the path-dependent effect of establishing Mexico as a supporter of international action on climate change. Second, with the rise in the international prominence of the UN climate negotiations, a wider array of government ministries began to engage in the climate policy process and bureaucratic politics impeded forward action. From 1995 to date, Mexico has followed a stop-and-go pattern of climate policymaking. Third, in contrast to the United States and Canada, industry actors, in particular Petróleos Mexicanos, Mexico's national oil company, have been advocates for precautionary action on climate change. And fourth, equally surprisingly, Mexican environmental NGOs have been largely absent from the climate debates. After a detailed discussion of these four features of the terrain of Mexican climate politics, I conclude the paper by assessing the future prospects of climate policy in Mexico.

THE TERRAIN AND EVOLUTION OF MEXICAN CLIMATE POLITICS

Scientific Community: Issue Definition and Initial Agenda Setting

Interest in climate change in Mexico dates back to the early 1990s. A defining feature of the climate issue at that time was its institutional home. Interest in climate change was initially concentrated among a small group of scientists and environmental bureaucrats at the Universidad Nacional Autónoma de México (UNAM), the national university, and at the Instituto Nacional de Ecología (INE), the research branch of the federal environmental agency, the Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT).[2]

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A concerted climate change research effort was initiated after the negotiation of the 1992 UN Framework Convention on Climate Change (UNFCCC). Through a collaborative effort, INE and the UNAM Centro de Ciencias Atmósphera (CCA) established a Programa Nacional Científico sobre Cambio Climático Global, that is, a national scientific program on global climate change, as a means to coordinate dispersed research relevant to the climate change issue (Gay Garcia 1994). These efforts received a further boost via financial support from the U.S. Country Studies Program (CSP), which provided financial and technical assistance to developing countries to support efforts to address climate change. Mexico's application for support was funded during the first round of applications in October 1993. The Mexico country study process was coordinated by INE and UNAM, and information was generated on three topics: 1) a greenhouse gas inventory for Mexico; 2) climate change and greenhouse gas emissions scenarios; and 3) improving on previous studies of Mexico's vulnerability to climate change impacts (Ramos-Mane and Benioff 1995)

The Mexico country studies process produced both technical and political results. The short-term outputs of the process were three workshops in April 1994, May 1995, and January 1996, presenting a range of research papers on inventories, scenarios, and vulnerability (Benioff, Ness and Hirst 1997). The country studies work was also the basis for Mexico's first national greenhouse gas inventory, published in December 1995 (Di Sbroiavacca and Girardin 2000), its first National Communication under the UNFCCC, completed in 1996 and submitted in November 1997 (Government of Mexico 1997), and a summary report on the vulnerability studies (Gay Garcia 2000).

Politically, the country studies process acted to centralize the group of scientists and bureaucrats working on climate change in Mexico. The contributors to various workshops and reports were housed within INE, various programs at UNAM, and the Instituto Mexicano de Petróleo (IMP), a research institute focusing on oil. Climate change as an issue was claimed by these organizations. Key individuals turned their status in the research community into leadership roles in the policy arena. For example, in 1995, after the UNFCCC took force, UNAM Professor Carlos Gay Garcia, a lead convener of the research effort supported by the U.S. Country Studies Program, became the lead expert on the Mexico delegation to the UNFCCC Conferences of the Parties (COPs) and the head of delegation at the Subsidiary Body meetings.

Government: Inter-ministerial Competition and Stop-and-Go Policymaking

With the entry-into-force of the UNFCCC, the profile of the climate issue shifted from being perceived as primarily a scientific issue to being viewed as a policy concern. 1995 thus marks the beginning of federal climate politics in Mexico. The overall stance of the Mexican government has been that climate change is a serious environmental issue, and that Mexico, in aggregate, faces a greater risk from climate change impacts than from adverse economic effects of greenhouse gas regulation. However, this generally supportive policy position masks significant disagreement between different federal agencies and significant fluctuations over time in federal government interest in the climate issue. I identify six key periods that have been markers in the evolution of Mexican climate politics at the federal level (see Table 2). Each of these periods has either advanced or retarded building momentum for climate regulation within the Mexican government.

TABLE 2: Key Events/Phases in the Evolution of Mexican Governmental Climate Politics

Phase 1: 1995-1996 Scientists dominate policy process	**1995—**Carlos Gay at UNAM establishes an "Ad-Hoc Group" to coordinate inter-ministerial dialogue on climate change **May 1995—**Second U.S. Country Studies Workshop **September 1995**—INE publishes Preliminary National Inventory of Greenhouse Gases **January 1996**—Third U.S. Country Studies Workshop
Phase 2: 1997 Jump in political prominence of climate issue	**April 1997—**"Ad-Hoc Group" is reorganized into a formal Inter-Ministerial Committee for Climate Change **September 1997—**SENER begins to engage in climate policy debates **September 1997—**Mexico publishes First National Communication under UNFCCC **September 1997—**Mexico hosts 12th plenary session of IPCC. **December 1997—**Kyoto Protocol negotiated
Phase 3: 1998-2000 Upsurge in momentum with ratification of Kyoto Protocol	**1998**—SEMARNAT supports ratification of Kyoto Protocol **1999—**SENER opposes ratification of Kyoto Protocol on climate change **December 1999—**Pemex announces proactive climate policy **April 29, 2000**—Mexican Senate votes to ratify Kyoto Protocol
Phase 4: 2000-2001 Decline in interest in climate change under new president	**August 2000—**Vicente Fox elected to presidency **December 2000**—President Fox assumes office **March 2001**—U.S. President George W. Bush withdraws United States from Kyoto Protocol
Phase 5: 2002 Upsurge in interest with European ratification of Kyoto Protocol	**Spring 2002**—Fox appoints Victor Lichtinger as Secretary of the Environment **May 2002—**EU ratifies Kyoto Protocol **October 2002**—discussion re creating a Mexican CDM office
Phase 6: 2003-2005 Domestic action bogged down due to inter-ministry competition	**March 2003**—Bilateral Working Group on Climate Change between United States and Mexico **January 2004**—Mexico establishes national Climate Change Office **December 2005**—Joint statement on climate change cooperation between Canada and Mexico

In the first phase of Mexican federal climate politics, scientists from UNAM and INE stepped into the policy arena. In 1995, UNAM professor Gay Garcia created an "Ad-Hoc Group" to coordinate inter-ministerial dialogue on climate change. This group prepared the Mexican policy position, in advance of the Conferences of the Parties, and was dominated by representatives from UNAM, INE, and SEMARNAT. This early period was one of building momentum that lasted until 1997, when, in the lead-up to the Kyoto Protocol negotiations, climate change became a hot political issue.

The second key event was the jump in the political profile of the climate issue in 1997. In the build-up to the Kyoto negotiations in December of 1997, the international climate negotiations process gained much higher public and political salience in the international arena, and, consequently, it began to be recognized as a much more important issue within Mexico. At that time, Mexico published its First National Communication under the UNFCCC (Government of Mexico 1997) and hosted the twelfth plenary session of the Intergovernmental Panel of Climate Change (IPCC). The effect of the shift from scientific to political issue was a widening in the field of actors and agencies that perceived themselves as having a stake in the climate policy process. In 1997 climate change became an issue of concern to the ministries of agriculture and rural development, commerce and industrial development, communications and transport, energy, and social development (SEMARNAP 1998). Among these ministries, the Secretaría de Energía (SENER) in particular began to take a much more active interest in the climate issue.

SENER's intensified engagement in climate policy was very influential. Observers date serious SENER involvement in the climate issue to early 1997. The COP 3 negotiations in Kyoto in December 1997 was the first time a representative from SENER was included in the Mexican delegation to the UN climate change negotiations since the first round of the negotiations in 1991. By 1998, several internal documents had been generated by SENER addressing energy and climate change issues (SENER 1998a; SENER 1998b). Unlike SEMARNAT, SENER was less concerned with Mexico's ecological vulnerability to climate change impacts and instead focused the potential adverse effects of international climate regulation on Mexico's oil economy. At the time, most oil-exporting countries were vocal opponents to action on climate change (Pershing 1999). Bureaucrats in SENER echoed this policy stance and have generally voiced opposition to climate regulation. Evidence of the consequences of both SENER's involvement in climate policy debates and the general politicization of the climate issue can be seen in the fate of UNAM Professor Carlos Guy's "Ad Hoc Group" for inter-ministerial dialogue. In 1997, the informal group was converted into a formal Comité Intersecretarial de Cambio Climático, with an expanded list of participating ministries (Belausteguigoitia and Lopez-Bassols 1999; SEMARNAP 1998). At the same time, Guy Garcia was replaced by Julia Carabias Lillo from SEMARNAP as the lead coordinator of the Mexican climate policy process.

The third key event in governmental climate politics was Mexico's decision to ratify of the Kyoto Protocol, a decision made on April 29, 2000 by the Mexican Senate. The decision to ratify was the result of an intense struggle between SEMARNAT and SENER. At the time, SENER was arguing against Mexican ratification of the Kyoto Protocol, while SEMARNAT was advocating for climate regulation. President Zedillo made the deciding choice to ratify, favoring the environment ministry. Petróleos Mexicanos (Pemex) was a key actor in this struggle (Gomez Avila et al. 2001). One might expect Pemex to have followed SENER's lead on climate change because of the close structural relationship between the two organizations. Formally, Pemex, along with the Comisión Federal de Electricidad (CFE), the national electricity company, and Luz y Fuerza del Centro (LFC), the electricity and power company serving Mexico City, are very large and semi-independent sub-groups within SENER. Despite this close relationship, Pemex and SENER developed their climate policies relatively independently. While SENER opposed action on climate change, Pemex was an advocate for action on climate change, even co-hosting climate change workshops with SEMARNAT in December 1999 (see below for additional information on Pemex's climate policy).

As a non-Annex 1 party, Mexico's 2000 ratification of the Kyoto Protocol resulted in few additional obligations. Moreover, at the global level, the prospects in April 2000 of the Kyoto Protocol's entry-into-force were very uncertain. None of the major Annex-1 countries (including the European Union countries, the United States, or Japan) had yet ratified the protocol. Nevertheless, domestic ratification of the Kyoto Protocol by Mexico sent a signal of moving forward on climate regulation. In line with this signal, SEMARNAT published a National

Strategy of Climate Action. Unfortunately, Mexico's ratification of the Kyoto Protocol did not build significant momentum for action on climate change because the decision to ratify was made towards the end of Zedillo's six-year term and the National Climate Program was not carried forward under the following administration.

The fourth key political event in governmental climate politics was thus the election to the Mexican presidency of Vicente Fox in August 2000, a position he assumed in December of that year. Not surprisingly, as the first non-PRI president in 71 years, environmental issues were not at the top of Fox's agenda. Moreover, among environmental issues, climate change was of low priority to Fox's environmental staff, as the issue had suffered several political setbacks in the international arena. Not only had the November 2000 round of the Kyoto Protocol negotiations (COP 6 in The Hague) collapsed because of disagreement between the United States and the European Union, but climate change advocates in Mexico received a further blow in March of 2001, when U.S. President George W. Bush withdrew the United States completely from the Kyoto Protocol negotiations. A cornerstone of Mexico's interest in the Kyoto Protocol was access to the Kyoto mechanisms, specifically the Clean Development Mechanism (CDM). Before the U.S. pull-out, the size of the CDM was estimated at US$2-4 billion, translating to a price of US$10-20 per ton of carbon, with the United States being the main purchaser of emissions (Quadri 2000). The expectation was that the United States would look to its southern neighbor for CDM opportunities (CCA/CEC 2001). With the pull-out of the United States, expectations for the size of the CDM collapsed, and prospects for a North American emissions trading bubble vanished (Betsill, this volume).

The fifth turnaround in Mexican federal climate politics occurred in spring of 2002. Fox's appointed Secretary of the Environment, Victor Lichtinger, had been a member of the Mexican delegation to five rounds of the international UN climate negotiations (INCs 1 to 5 part 1), but it was not until after a presidential visit to Europe in the spring of 2002 that Lichtinger started raising the profile of the climate issue in Mexico. Lichtinger met with the heads of European and EU environment ministers during the push for EU ratification of the Kyoto Protocol. The EU's decision to ratify was announced in May 2002. With EU ratification, the CDM once again became a viable mechanism to attract foreign investment into Mexico's energy and environmental sectors. Climate discussions within Mexico's federal government ministries in 2002 focused on the creation of a national climate change office, or more accurately, a national CDM project approval authority.

Little concrete action came from the flurry of activity in 2002, and the sixth and current period of Mexican climate politics is characterized by little real progress. In part the lack of progress is due to competition between federal agencies over control of the climate issue. INE, which played a lead role historically, was divested of its policy functions in 2000 and re-tasked as a research institute. Today, it maintains the responsibility for generating the greenhouse gas inventory data and National Communications (Tudela, Gupta, and Peeva 2003). Policy decisions continue to be deliberated via the Comité Intersecretarial de Cambio Climático, which includes among its members seven ministries (agriculture, transport, social development, environment, energy, economy, and foreign affairs). SEMARNAT is the coordinating ministry and also houses a department of climate change projects, which acts as the designated national authority for CDM projects (SEMARNAT 2006). However, this department within SEMARNAT does not seem to play the prominent role envisioned in 2002 for a Mexican Climate Change Office. Most new activities on climate change appear to be driven by bilateral initiatives. In 2003, the United States and Mexico pledged to strengthen bilateral cooperation on climate change, creating a Bilateral Working Group on Climate Change (U.S. Department of State 2003). Likewise, Canada and Mexico signed a joint statement on climate

> A striking feature of Mexican climate politics is the active engagement of certain key industries in the climate policy debates.

change cooperation during COP/MOP 1 in December 2005 (Government of Canada 2005).

Industry: Petróleos Mexicanos as an Industry Pioneer

A striking feature of Mexican climate politics is the active engagement of certain key industries in the climate policy debates. As mentioned above, Petróleos Mexicanos (Pemex), Mexico's national oil company, was a vocal advocate for action on climate change from 1999 to 2002. Pemex is also the first and only developing country oil company to have taken on a company-wide carbon dioxide emissions reduction target and to pilot an internal corporate emissions trading system (Pemex 2002). More recently, 15 Mexican companies, mostly from energy-intensive sectors, were recognized for participating in a greenhouse gas inventory initiative and for publicly reporting their emissions (WRI 2006b). In the following paragraphs, I describe in detail the origins of Pemex' proactive climate policy. I focus on the Pemex case because the company's engagement with climate change issues became path-setting for the Mexican private sector.

Pemex's interest in climate change dates back to 1995 when the company cooperated by providing information for Mexico's first National Communication under the UNFCCC.[3] The Pemex in-house environmental magazine, *Gaceta Ecológica*, first included an article on climate change in its September 1997 issue in the lead-up to the December 1997 Kyoto Protocol negotiations. The next step was the December 1999 launch of its new and improved environmental division, where Pemex first publicly announced its climate-friendly policy at a conference jointly organized by Pemex, SEMARNAT, the UN Development Program (UNDP), and UNAM (Pemex 2001). The company published its first official climate policy statement in April of 2000 with the launch of the *1999 Annual Report on Safety, Health, and Environment*—the first of its kind. The report announced Pemex's proactive policy on greenhouse gas emissions and provided information on the generation of carbon dioxide emissions from Pemex operations. Estimated emissions for 1999 amounted to almost 40 million tons of CO_2—approximately equivalent to the annual greenhouse gas emissions of Ireland (WRI 2003). The following year, Pemex announced a corporate emissions reduction target, pledging to reduce its greenhouse gas emissions by one percent by the end of 2001, and developed an internal emissions trading program (Pemex 2002). To date, Pemex currently stands apart from its peers as the sole nationally-owned oil company from a developing country that has adopted a company-wide carbon dioxide emissions reduction target.

How did Pemex come to adopt a proactive climate policy? I argue that the process by which Pemex executives formulated the company's climate strategy was one of "importing environmentalism." Pemex is proud of its position as the sixth largest oil company in the world and, despite state ownership, strives to mimic the management techniques of the global oil majors. It has a documented history of surveying industry best practices and then tailoring them to Pemex's situation in Mexico (Quintanilla and Bauer 1995). Pemex's climate program showcases how the company's executives took their cues from the international oil and climate governance communities and then formulated a Pemex climate policy. In particular, Pemex acted as "close follower" of British Petroleum (BP), the oil major that Pemex managers identified as the industry leader in the climate arena.

A close analysis of the components of Pemex's climate policy reveals the similarities to BP's climate program, and Pemex executives publicly acknowledged their copying of BP. In a 1999 speech, the president of Pemex gave credit to BP for setting the standard for environmental management in the oil industry and for inspiring the Pemex program. The connections between Pemex and BP were facilitated by Environmental Defense (ED), a U.S. NGO, and the U.S. Agency for International Development (USAID). In May 2000, six months after hosting its December 1999 climate conference, several Pemex representatives attended a workshop in Washington, D.C., titled "Market Approaches to Environmental Protection." The workshop was organized by the USAID Center for the Environment. The USAID Mexico representative used this opportunity to arrange a meeting between the Pemex representatives, including Javier Bocanegra, a senior environmental manager at Pemex, and the emissions trading team from Environmental Defense that was presenting during the workshop. Individuals from Pemex and Environmental Defense met repeatedly during the course of the workshop, meetings which laid the groundwork for Pemex to join BP, Shell, and other companies in the ED Partnership for Climate Action. The Partnership brought together companies willing to take on corporate greenhouse gas emissions reductions targets and experimenting with emissions trading as a mechanism for meeting targets in a cost-effective manner (ED 2000).

Four conditions facilitated Pemex's "importing" of its climate policy. First, it is unlikely that Pemex would have pursued a climate-friendly policy if Mexico had been an adamant opponent to action on climate change at the international level. Despite the stop-and-go character of Mexican climate politics, Mexico has been an advocate for action on climate change in the international community. Second, Pemex was not predisposed to reject a climate-friendly policy because its initial contact to international climate issues was made via SEMARNAT, the environmental ministry, rather than SENER, the energy ministry. The initial seeds of Pemex's climate policy can be found in the company's early collaboration with environmental scientists at INE and UNAM. The two communities were brought into contact via the national Greenhouse Gas Inventory project, mandated by the 1992 UNFCCC. Had this contact not been initiated, the most likely outcome is that Pemex would have adopted SENER's more adversarial approach to climate regulation.

Third, Pemex managers were able to justify the climate-friendly policy via pre-existing business objectives. Although the particular content of Pemex's climate policy came from the international community, Pemex justified the policy via its own business needs. In the late 1990s, Pemex was under strong pressure to reform it operations, focusing particularly on improved operational efficiency and access to foreign investment (Shields 2001). Pemex's climate policy addressed each of these objectives. Most of the projects identified through the internal emissions trading system are efficiency projects. One Pemex executive described the program as an attempt to change the way employees think. In the past, Pemex's primary goal was to maximize production, regardless of cost. Now the emphasis is shifting to efficiency, and emissions trading serves as a tool to reorient employees' priorities. Likewise, CDM projects were promoted as a means to channel foreign investment. CDM projects bypass the constitutional restriction by being defined as the "the sale of environmental services."

The fourth precondition for Pemex's climate friendly policy was the receptiveness of Pemex leadership to environmental initiatives. Rafael Fernandez de la Garza, Pemex's Director of Environmental Health and Safety, came to the company from a regulatory position in the nuclear industry. During his tenure as a nuclear regulator, he was the target of ongoing environmental protests against the Laguna Verde nuclear power plant, Mexico's only nuclear energy facility. Interviewees reported that his experience in the nuclear industry made him very environmentally aware. Likewise, key employees within the environment division acted as norm entrepreneurs, promoting action on climate change as a viable oil company policy strategy.

Since 2002, Pemex has backed away from its active engagement with climate change. The ED Partnership for Climate Action is no longer active, and Pemex did not follow-up its one percent reduction target with a more stringent ten percent reduction target, as was being discussed in 2002. That year also marked the last year that Pemex published a corporate annual report on health, safety, and environment. Nevertheless, I argue that Pemex played a pioneering role, generating interest in climate change among industry actors in Mexico and Latin America and among state-owned oil companies.

Pemex's support for action on climate change weighed in Zedillo's 2000 decision to ratify the Kyoto Protocol. Moreover, the Mexican government is currently promoting both CDM and emissions-trading mechanisms. They are in close discussion with Pemex to make sure that Pemex projects are eligible under the CDM rules. Moreover, the government has followed Pemex's lead and is developing an interest in emissions trading. In September of 2002, preliminary discussions were held within the environment and energy ministries regarding the expansion of the emissions trading system to include CFE, the national electricity company, along with Pemex, and even the idea of a national trading system. Although these discussions did not materialize in a concrete program, a recent private-sector initiative is a positive sign. In 2004, Mexico adopted a corporate greenhouse gas protocol developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). Jointly with SEMARNAT, WRI and WBCSD launched the Mexico Greenhouse Gas Program under which 15 Mexican companies compiled corporate greenhouse gas inventories—the necessary precursor to emissions trading. Twelve additional companies are still in the process of compiling their inventories (WRI 2006b).

In addition to efforts within Mexico, Pemex has also been a regional industry leader on climate change. In October 2001, the oil and gas industry association of Latin America and the Caribbean (ARPEL) organized a workshop on designing projects to meet CDM criteria. The workshop was held in Mexico City where Pemex

acted as host. The pattern of organizing and hosting climate related workshops continued in 2002. In May of that year, Pemex once again played host to an ARPEL workshop, this one focusing on emissions trading. A month later, Pemex, along with the Canadian Petroleum Institute, held a workshop on the CDM. The workshop was scheduled to coincide with Pemex Environment Week and the release of its third Environmental Health and Safety annual report. Finally, Pemex may turn out to be a leader among state-owned oil companies. Earlier this year, Saudi Aramco, Saudi Arabia's national oil company, convened a conference of experts to brief corporate executives on the climate change issue.[4]

Civil Society: Climate Change Is Not a Priority Issue

Within North America, the Mexico case is unique for the absence of a civil society-led campaign around climate change. The NGO community in Mexico is vibrant, yet still in the early stages of its development. Delgado (2001) identifies the 1980s and particularly the battle against the Laguna Verde nuclear power plant as the beginning of a self-identified environmental NGO community in Mexico. This community continued to thrive and expand in preparation for the first Earth Summit in Rio de Janeiro in 1992 and beyond; however, it has not mobilized around the climate issue. A combination of factors accounts for the fact that no Mexican NGO has launched a climate campaign.

Most importantly, climate change is not a priority environmental issue for environmental NGOs in Mexico. Mexico is not a major global greenhouse gas emitter. Based on 1995 greenhouse gas emissions, Mexico ranked fourteenth, between South Korea and South Africa, contributing just 1.48 percent to total global greenhouse gas emissions (SEMARNAP 1998). Moreover, the Mexican government has generally been forward thinking on the climate issue. In addition, there is little public pressure for action on climate change. Although there is no rigorous public opinion data documenting public awareness and understanding of the causes and consequences of climate change, anecdotal evidence suggests that the issue is as misunderstood in Mexico as it is in most other countries. For example, during a national evening news broadcast about Environmental Secretary Lichtinger's visit to the EU in April of 2002, the anchor read text regarding the ozone hole and CFCs as the main part of a segment on global warming.

Most Mexican NGOs focus their efforts on environmental concerns that are perceived as more pressing and deserving of attention than climate change. They focus on local issues, either "green" conservation issues or "brown" contamination and pollution concerns. Green-issue NGOs have a high profile in Mexico and work on conservation projects through collaborations between local community groups and large international NGOs, such as Conservation International and the World Wide Fund for Nature (WWF). As one of 12 "mega-diverse" countries, Mexico is a biodiversity "hotspot" (Ramamoorthy et al. 1993). Brown-issue NGOs are generally focused on local pollution and do not link with international campaigns.[5] For example, in the oil-producing state of Tabasco, there is a long history of activism focused on the adverse environmental effects of oil extraction and refining activities. The target of activism is Pemex (Town and Hanson 2001). In Mexico City, the primary issue of concern is local air pollution and the focus is on redesigning the city's transportation infrastructure (WRI 2006a). These activities are recognized as generating climate benefits (West et al. 2004), but the driver for action is local air pollution concerns (Betsill, this volume).

Among the Mexican environmental NGO community, there are three groups well-positioned to potentially organize a climate campaign. They are Greenpeace Mexico, the Centro Mexicano de Derecho Ambiental (CEMDA), and the Unión de Grupos Ambientalistas (UGA). These three groups employ staff with advanced degrees, can access the international environmental advocacy community, and have the relevant experience in Mexican politics; in other words, they have the necessary resources and expertise to campaign on climate change. However, policy directors and campaigners from Greenpeace Mexico, CEMDA, and UGA all reiterated that that climate change is simply not a priority issue for their organizations.

Future Prospects for Climate Action in Mexico

Understanding the history and evolution of climate politics in the scientific, political, economic, and civil society arenas sheds light on future prospects for climate action in Mexico. First, Mexican interest in the climate issue is driven by the actions of Annex-1 countries, including but not limited to the United States and Canada. Second, a primary barrier to federal action is inter-ministerial competition over ownership of the climate issue. Third, the most active

site for entrepreneurial action on climate protection is emerging in the private sector.

Climate activities in state and non-state arenas in the United States and in other Annex-1 countries have played a significant role in Mexican climate politics. The U.S. Country Studies Program was central to organizing Mexico's climate research community, a constituency that played a galvanizing role in Mexico's initial response to climate change. The evolution of federal climate politics in Mexico also showcases the importance of connections to Annex-1 countries, particularly the United States. At the federal level, action on climate change in Mexico has followed a stop-and-go pattern. After building momentum by voting to ratify the Kyoto Protocol in early 2000, action decelerated with the election of a new president in August of 2000 and came to a standstill when the United States announced that it was withdrawing from the Kyoto Protocol negotiations in April 2001. Interest in the issue was reignited only when the European Union and Japan ratified the Kyoto Protocol in 2002. Finally, activity in the United States has been a key part of climate action in Mexico's private sector. Both the Pemex climate change initiatives and the Mexico Greenhouse Gas Program followed a common organizational pattern. They are the products of collaboration between business actors in Mexico and U.S.-based environmental NGOs.

Unfortunately, the current state of international and domestic climate politics in the United States and Canada makes significant change in Mexico's climate policy unlikely. Climate change was not a key issue during the July 2006 presidential election. Neither the winning candidate, Felipe Calderón, nor his main rival, Andrés Manuel López Obrador, focused on or made climate change a central plank of his campaign. Only a decision by the United States to re-engage in the Kyoto process or a decision by Canada to meet its Kyoto target via significant CDM investment in Mexico would drive renewed interest in the climate issue in Mexico. If this were to happen, action on climate change in Mexico would still face the obstacle of inter-ministerial competition over the issue. Mexico's current course on climate change is being set by an inter-ministerial dialogue at the federal level, which is characterized by competition between ministries, particularly the environmental ministry (SEMARNAT) and the energy ministry (SENER).

Given inter-ministerial competition at the federal level and the absence of civil society interest in climate change, the private sector remains as the most promising arena in which to promote bottom-up action on climate change in Mexico in the short term. With the upsurge in sub-national climate change activities in the United States, there are many prospects for partnerships; particularly promising are activities in the transportation and energy sectors that link U.S. NGOs with business and industry actors in Mexico. Such activities could build on pre-existing environmental collaborations at sub-national administrative levels, such as air pollution control activities in Mexico City or on the U.S.-Mexico border region. To date, Mexico has not yet seen the emergence of vibrant city and state-level climate politics, which are the focus of action in the United States and Canada.

NOTES

1. For an overview and history of general environmental policy in Mexico, please refer to the OECD environmental performance review for Mexico (OECD 1998). The most comprehensive compilation of research and policy analyses addressing climate change in Mexico was assembled by researchers at the Instituto Nacional de Ecología (Martinez and Fernandez Bremauntz 2004).

2. SEMARNAT was established in 1994 as the Secretaría de Medio Ambiente, Recursos Naturales, y Pesca (SEMARNAP). The name change dates to 2000 (SEMARNAT 2002). Prior to 1994, environmental issues were under the purview of the Sub-secretaría de Desarollo Urbano y Ecología (SEDUE), the ministry of urban development and ecology, established in 1982. In 1992, SEDUE was transformed into the Secretaría de Desarollo Social (SEDESOL), the ministry of social development. At the same time, two independent technical bodies were created to support SEDESOL: the Instituto Nacional de Ecología (INE), an environmental research institute, and the Procuraduría Federal de Proteccion al Ambiente (PROFEPA), an environmental enforcement agency (OECD 1998).

3. As such, Pemex was a late entry into the climate change field when compared to the Western oil majors. Exxon, BP, and Shell all began to engage with the climate issue in the late 1980s.

4. Personal communication, March 23, 2006.

5. Greenpeace is the one exception to this rule. The Greenpeace Mexico office campaigns on conservation and pollution issues, mobilizing local groups as well as resources from the international Greenpeace organization.

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Renewable Electricity Politics across Borders

IAN H. ROWLANDS

It is now widely accepted that many of the systems of generating electricity in place worldwide are unsustainable. In spite of helping to create unprecedented levels of economic wealth, a predominant reliance upon large, centralized power stations, largely "fueled" by fossil fuels and uranium connected to a web of transmission and distribution lines, has a number of negative consequences as well (Holdren and Smith, 2000). One of the most significant of those sustainability impacts is the effect that systems of electricity supply have on global climate change. With 66 percent of the world's commercial electricity generated by fossil fuels in 2003 (including 40 percent of the total by coal) (IEA, 2006), conventional methods to generate power are serving to increase carbon dioxide concentrations in the atmosphere (and, though to a lesser extent, also serving to increase concentrations of other greenhouse gases).[1] As such, a reconsideration of how electricity services are provided (and the extent to which they are needed, or might be provided by other, non-electrical, means) is critical. While an effective response to increasing energy sustainability consists of numerous different approaches—energy efficiency and conservation is also a key part of the overall strategy—it is widely agreed that the greater use of renewable resources in electricity supply should be part of the wider plans. This is not only to mitigate climate change specifically, but also to advance sustainability more generally.

This sentiment—that is, that increased use of renewable electricity should be a key part of broader climate change mitigation strategies and plans—has been expressed by a variety of international organizations and national governments. Working Group III of the Intergovernmental Panel on Climate Change, for example, devotes considerable attention to the ways in which the greater use of renewable electricity could serve to address climate change challenges. In particular, it is often argued that it is during the longer-term—that is, 20 or more years—that renewable electricity could play a large role, for it is recognized that many parts of the electricity system have a useful lifetime of 20, 30, 40 years or more (IPCC, 2001).

> "With 66 percent of the world's commercial electricity generated by fossil fuels ... conventional methods to generate power are serving to increase carbon dioxide concentrations in the atmosphere.

As another example of the attention that renewable electricity is receiving in international fora, the leaders of the G8, in the 2005 Gleneagles Communiqué, declared that they "will promote the continued development and commercialization of renewable energy" (G8, 2005). National governments have also done the same: the United Kingdom's March 2006 Climate Change Programme, for example, had energy supply—with renewable energy resources through the country's Renewables Obligation playing a key role—as the first of six chapters that, together, outline the key elements of the national plan (Government of the United Kingdom, 2006).

Turning to the two countries under consideration in this article, namely, the United States and Canada, first consider the former: the White House maintained, in its Energy Policy Act of 2005, that it was promoting "the use of renewable energy sources ..." (White House, 2005). And with respect to the latter, though the new federal government had not, as of June 2006, described how its "Made In Canada" approach to climate change might include support for renewable energy, the previous Canadian government saw renewable electricity as central, as evidenced by the role of both a wind power production incentive and a renewable power production incentive in the 2005 Action Plan on Climate Change (Government of Canada, 2005).

The relative role of renewable resources in both the United States' and Canada's electricity supply systems is shown in Table 1. As will be explored further on in this article, the significance depends to a great extent upon how "renewable" is defined. What is clear following this table, however, is that the role of "new renewables" often focusing upon solar and wind, but also sometimes including low-emission (and sustainable) biomass and run-of-river hydropower, is extremely small.

TABLE 1: Electricity generation by source, Canada (2003) and the United States (2004)

	Coal	Natural gas	Other fossil fuels	Nuclear	Hydropower	Other renewables	Wood and other*	Total generation (Gigawatt-hours)
Canada	18.6%	5.9%	2.8%	12.4%	59.0%		1.4%	567,383
United States	49.7%	17.8%	3.6%	19.8%	6.7%**	2.3%		3,970,555

* includes wood waste and spent pulping liquor, manufactured gases, other petroleum products, other fuels and station service.

** Conventional hydropower only.

Sources: EIA, 2005; Statistics Canada, 2004.

Against this background, this article seeks to investigate the cross-border (Canada-United States) issues that are arising and could arise with respect to desires to increase the use of renewable electricity.

To do this, this article is divided into five sections. Following this introduction, a brief review of Canada-U.S. electricity exchanges—and relations more generally, is presented. This helps to provide the context by outlining the ways in which the two countries already interact on power issues. In the third section, issues that have already arisen with respect to renewable electricity between the two countries are examined—here, the key point of contention has been with respect to the southward movement of electricity generated by large-scale hydropower facilities. This discussion leads into a subsequent exploration of additional issues that could arise between the two countries. The differing perspectives with respect to hydropower that already exist help us to anticipate further debates with regard to the way in which the definition of renewable or green could arise; issues related to cross-border investment, green procurement, subsidies and tradable certificates are also identified. Finally, the last section summarizes the argument, reiterates the potential significance of the subject and highlights some areas for further investigation.

CANADA-U.S. ELECTRICITY EXCHANGES AND RELATIONS

One might immediately wonder why an article is focusing upon electricity exchanges across an international border. After all, electricity, by its very nature economically unfeasible to store, physical (and economic) losses associated with its long-distance transmission appears to be a commodity that is largely contained within a local system. Little is usually made of the international trade in electricity compared to many other goods and services. Why then, should there be interest in cross-border exchanges between Canada and the United States?

It certainly is the case that traditionally in these two countries electricity has been predominantly a local concern. Relatively little of the electricity generated in either Canada or the United States is usually exported to the other country.[2] Nevertheless, given the significant total value of the electricity supply industry in both Canada and the United States, this still represents a substantial figure in absolute terms—in 2005, it totaled C$5 billion (National Energy Board, 2006). Table 2 highlights the largest exchanges of electricity that occurred between the two countries in 2005.

TABLE 2: Electricity trade between Canada and the United States (>1,000 GWhr for 2005)

5,094			2,806	4,380		2,489			
British Columbia	British Columbia	Manitoba	Ontario	Ontario	Ontario	Québec	Québec	Québec	New Brunswick
↓↑	↓	↓	↑	↓↑	↓	↓↑	↓	↓	↓
Washington	Oregon	North Dakota / Minnesota	Minnesota	Michigan	New York	New York	Vermont	New England	Maine
2,451	4,284	11,399		1,681	6,530	4,162	1,866	3,764	2,890

Note: values are given in GWhr.
Source: National Energy Board, 2006.

Indeed, it is important to recognize that there are a variety of institutional and physical links in terms of electricity between Canada and the United States (Gattinger, 2005). For one, governance of different parts of these countries' (interconnected) power systems is already international. Indeed, the North American Electricity Reliability Council and its various committees (including the Western Electricity Coordinating Council, the Mid-Continent Area Power Pool, and the Northeast Power Coordinating Council) is perhaps most critical in this regard: formed in 1968 following a major power blackout that occurred in 1965, the Council is charged with ensuring that the bulk electric system in North America is reliable, adequate, and secure.

The August 14, 2003 blackout reminded us how closely these two countries' electricity systems are physically linked. At that time, accidents and errors in the state of Ohio "cascaded" out of control, so that eventually both countries—an estimated 50 million people in eight states and the province of Ontario—were affected.[3] With "51 electricity grid connections that cross the Canada-U.S. border" (NRCan, 2003), electricity is, every minute of every day, a transnational issue.

Moreover, various organizations on both sides of the border are calling for greater international cooperation on energy issues, including electricity. The United States, for example, produced its "National Energy Policy" in March 2001. In that report, it was recommended in a broad and general sense that "a North American Energy Framework [be supported] to expand and accelerate cross-border energy investment, oil and gas pipelines, and electricity grid connections

by streamlining and expediting permitting procedures with Mexico and Canada" (NEPDG, 2001).

Focusing explicitly upon electricity, the report also noted that international interconnections between Canada and the United States "provide important trade and clean air benefits, while allowing both countries to benefit from load sharing and integration. The reliability of the North American electricity grid can be enhanced yet further through closer coordination and compatible regulatory and jurisdictional approaches." (NEPDG, 2001) Recommendations for closer electricity ties both institutional and physical thus followed.

In a similar vein, the Canadian prime minister and the U.S. president (along with the Mexican president) agreed at the Summit of the Americas in Québec City (April 22, 2001) that their newly-created North American Energy Working Group "will be a valuable means of fostering communication and coordinating efforts in support of efficient North American energy markets..." (CEC, 2002). This group issued its report the following year (NAEWG, 2002). More recently (May 4, 2006), energy representatives from Canada, the United States, and Mexico met to discuss, among other things, "the expanded use of alternative energy sources among the three countries" (U.S. Department of Energy). Thus, not only are there substantial connections in terms of electricity between Canada and the United States already in place, but some are calling for these links to be strengthened and replicated in order to advance efficiency and reliability goals. As such, the way in which the visibility and significance of cross-border issues related to renewable electricity could grow is evident.[4]

CURRENT ISSUES

Presently, the most contentious Canada-U.S. issue in the area of renewable electricity involves the appropriate role of hydropower in the pursuit of sustainable electricity goals. More specifically, there are disagreements regarding the role of large-scale hydropower. On the one hand, proponents of large-scale hydropower argue that it is a renewable resource, with low emissions. Hence, they continue, because it can contribute to a variety of clean air goals, it should not be "shut out" of any market where renewable electricity is being encouraged. On the other hand, opponents argue that large-scale hydropower has a number of challenges associated with it: environmental problems include habitat destruction and associated biodiversity loss, and social difficulties include the displacement of settlements. (For a review of many of these debates, see the report of the World Commission on Dams—an international group convened in 1998 in order to "review the development effectiveness of large dams and assess alternatives for water resources and energy development; and develop internationally accepted criteria, guidelines and standards, where appropriate, for the planning, design, appraisal, construction, operation, monitoring and decommission of dams" (World Commission on Dams, 2000).)

Moving from the general to the specific, debates have emerged between Hydro-Québec and those in the northeastern United States (markets in which Hydro-Québec is active) and Manitoba Hydro and Minnesota (similarly, a market in which Manitoba Hydro is active). In the case of the former, a number of states have explicitly excluded large-scale hydropower from their policy tools that serve to encourage increased use of renewable electricity. In Rhode Island, for example, only hydropower under 30 MW can qualify for its Renewable Portfolio Standard.[5] For its part, Hydro-Québec has responded vigorously, advancing its case in state-level deliberations (for example, it intervened in New York State discussions about renewable policy options (H.Q. EnergyServices, 2003)) and continental-level fora (for example, it prepared a submission to the NAFTA body investigating "Environmental Challenges and Opportunities of the Evolving North American Electricity Market" (Hydro-Québec, 2000)); the Québec government has similarly contributed to the debates, arguing that the development of its hydroelectric potential should, once again, be a top priority (Government of Québec, 2006). Nevertheless, the use of large-scale hydropower continues to be opposed by many "on the ground" in this part of the United States.[6]

In the case of the latter, a citizens' group entitled "JustEnergy" (part of a larger organization, Minnesotans for an Energy-Efficient Economy) has been active in challenging the social and environmental attributes of electricity imports generated by large-scale hydropower in Manitoba. A representative sentence follows: "Because Manitoba Hydro doesn't have to take into account the full environmental and human rights costs

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of its dam projects, its electricity is artificially cheap, and unfairly competes with truly renewable Minnesota energy sources, like wind" (JustEnergy, n.d.).[7] For its part, Manitoba Hydro has responded vigorously, disputing, claim for claim, the accusations put forward by the group (Manitoba Hydro, n.d.).

The debate has also played out between national governments. The Canadian federal government has continued to note its unease about the way in which hydropower was being defined in U.S. legislation. In 2003, for example, Canada expressed concern "over proposals in recent U.S. federal and state legislation to exclude Canadian-origin renewable-energy resources and hydroelectric power from U.S. renewable-energy programs. Canadian advocacy in this sector has raised U.S. awareness of a North American electricity market and the impact that discriminatory measures could have on this market. Canada continues to monitor developments in U.S. renewable energy standards" (International Trade Canada, 2003). That same year, the Canadian ambassador to the United States told U.S. legislators, "Canada notes the Senate proposal to mandate a renewable portfolio standard (RPS) for electricity generation. All hydroelectricity, not just incremental hydroelectric generation, is renewable energy. Should an RPS emerge in your legislation, we would request that hydroelectricity not be disadvantaged. We wish to point out that given NAFTA and WTO obligations, any RPS must be non-discriminatory vis-à-vis Canadian and U.S. generated electricity" (Kergin, 2003). In 2005, his successor took the same tack when he argued: "We should note that hydroelectricity is clearly a renewable energy. As it represents 57% of the electricity generated in Canada, there is no need for Canada to establish a five to ten percent renewable portfolio standard as many states in New England and elsewhere in the United States have done. … However, to Canada, hydro-generated electricity, whether produced or purchased, should count for any RPS." (McKenna, 2005)

For its part, the United States government is continuing to develop its own federal policies that involve definitions of renewable electricity. Similarly, it appears supportive of those being developed at the state-level as well. In 2002, in response to NAFTA work on this issue, the assistant administrator of the U.S. EPA commented: "... the [NAFTA] report suggests that U.S. state renewable-energy programs may be viewed as possible barriers to international trade. … We have not encountered any trade disputes related to differing renewable-energy standards or definitions, and we see no indication of any trade barrier arising from differing definitions" (Ayres, n.d.). It remains, however, a point of debate between the two countries. Recent work by the Renewable Energy and International Law Project (an international collection of academics, lawyers, and others, whose work was catalyzed by the International Conference on Renewable Energies in Bonn, Germany in June, 2004), and the ways in which connections between renewable electricity and global climate change are being made therein, effectively demonstrate that interest in this area continues (REIL, 2006).

POTENTIAL ISSUES

As already suggested by the section above, there exist different views across North America with respect to how renewables (or, alternatively, green power or green energy) should be defined. Indeed, a 2003 report from the Commission on Environmental Cooperation—the international organization created by Canada, Mexico, and the United States under the North American Agreement on Environmental Cooperation (NAAEC), which was, in turn, a product of the North American Free Trade Agreement negotiations—revealed a variety

of perspectives across the continent. While there was "the most unanimous and unqualified support" for solar energy (thermal or photovoltaic) and wind, others received more varied reaction: in particular, "biomass and hydropower [were] both important sources that are widely considered as renewable but which are generally included with other restrictions that vary widely from jurisdiction to jurisdiction" (CEC, 2003). There is little reason to doubt that that continues today: the Database of State Incentives for Renewable Energy identifies, in the United States, 299 different "rules, regulations and policies for renewable energy." Continuing developments regarding renewable electricity policy in Canada lend further support to this observation (Whitmore and Bramley, 2004). In many of these, moreover, there is explicit link to climate change (for U.S. examples, see Rabe, 2004, and Rabe, this volume; for Canadian ones, see DSF, 2005).

Why might this be problematic? By introducing legislation that effectively restricts part of an electricity market only to renewable forms of electricity, critics could maintain that a particular government has introduced an unjustifiable restriction on trade. After all, they might continue, it is largely accepted that electricity is a "good," and that all electrons, after all, "look the same." They could well demand similar treatment for their (non-renewable) form of electricity. Indeed, Horlick et al. (2002) put forth this argument, which suggests that all kinds of renewable portfolio standards could be challengeable under trade law.

That argument, however, has been challenged by others who argue that non-renewable and renewable electricity are, in fact, different. Hempling and Radar (2002) maintain that because there is a much-higher public appetite for renewable electricity, as compared to conventional forms of electricity, it is effectively shown that the two "kinds" of electricity are different (because people feel differently about them). Howse (2005) argues that electricity cannot be viewed in isolation from the way in which it is generated: physics teaches us that electricity is not produced but instead is simply another form of energy that has been transformed. As such, it cannot be divorced from its generation process. As Howse (2005) states: "Put simply, energy *is* a process. Thus, in considering 'physical characteristics' in the context of determining whether renewable energy is like or unlike non-renewable energy, the WTO adjudicator would almost necessarily, on the basis of sound science, be required to consider the physical nature of a *process*."[8]

Finally, recent case law, for example, judgments in the cases of Turtle/Shrimp, EC-Asbestos and Japan-Alcohol, is opening the door, many argue, for looking at the production and process methods behind the good itself. This provides, proponents maintain, additional support for the argument that renewable electricity is different.

Does the discussion change when we restrict attention to renewable electricity itself, and consider different kinds within this more restricted subset? As noted above, there is already such a discussion surrounding hydropower (large-scale versus low-impact, for example). Additionally, there are debates regarding whether restrictions should be based upon the geographical location of facilities that generate renewable electricity (particularly whether they are inside or outside of the particular jurisdiction enacting the legislation) or based upon the age of these facilities (with some programs favoring new renewables, with new defined differently in different places). Some RPS programs currently in place in the United States limit renewable electricity on the basis of one or both of these characteristics. Some have problems with this, for they maintain that the RPS policy has little to do with the environmental goals that may be laid out in the preamble of the relevant piece of legislation, but instead is about protecting and/or developing local industries.

> "... as efforts to develop climate change mitigation policies and programs continue at national and sub-national levels, development of renewable electricity sources will no doubt continue to be part of the discussions.

In these cases, it would seem that the particular goal of the legislation and the extent to which the goal is defensible would be key. If the aim of the renewable electricity legislation is to meet the challenges of global climate change, then it might be that even nuclear power could be included certainly the location of the generating facility would not seem to matter. Alternatively, if the aim is about local air quality, then the proximity of the generators would seem to be particularly important. In cases such as this, the goal of the legislation and how the legislation could potentially be protected by General Exceptions in international trade law (GATT's Article XX and NAFTA's Article 2101) would be critical.

In a similar vein, investment disputes could also lead to cross-border discussions and/or conflicts.[9] It is possible that certain provisions of NAFTA's Chapter 11 (the investment chapter) could apply even in the absence of "true deprivations of property" (that is, one's traditional view of corporate expropriation by host governments "nationalizing" foreign companies and taking over their assets). Instead, there might need to be "compensation for any government action which has a significant impact on the profit-making ability of an investment" (Horlick et al., 2002). Horlick and colleagues (2002) go on to argue that: "If the approach set out there [in the Metalclad case] is maintained, then any post-investment environmental measure applied in the electricity generation and distribution sectors that impact on the profitability of a foreign investor will require compensation to be paid."[10]

An example of such a challenge, involving renewable electricity in Canada and the United States, can be envisaged. Consider fictional jurisdiction A. Its government had traditionally taken a "laissez-faire" attitude towards renewable electricity. As a result, a company from jurisdiction B sets up a landfill gas recovery-to-electricity unit in jurisdiction A, and markets the resulting power using green power language and images. Further imagine that the leadership in jurisdiction A then has a change of heart, and decides to actively advance renewable electricity by introducing its own support scheme (rather than having the default national one that is the emerging norm as developed by industry's practices be the only one in existence). Legislators there decide to introduce an RPS. Following the results of local polling, these legislators decide that "renewable" consists exclusively of solar and wind. As a result, the company from jurisdiction B can no longer market its biomass-sourced electricity as a premium (environmental) product. That company's officials may then argue that because biomass is just as renewable as the privileged sources (solar and wind), the legislation is unfair. They then proceed to argue that the introduction of the RPS amounts to "de facto expropriation of assets" and they demand compensation for lost revenues. Although it is hard to anticipate the outcome of such a case, it is certainly reasonable to state that the case put forward by the company from jurisdiction B could be viewed sympathetically by a NAFTA panel.[11]

Staying with the point about varying definitions of renewable energy (or green power, or whatever term is being used), issues related to government procurement have the potential to become prominent. The government purchase of a green product in a systematic manner has been a relatively popular form of encouraging uptake of renewable electricity to encourage "learning by doing" and to stimulate the market for these kinds of electricity. Key examples include Natural Resources Canada, which began purchasing green power for some of its facilities in 1997 (see also CEC, n.d.).

In North America, green procurement is affected by the terms of NAFTA's Chapter 10, which applies to listed federal government entities and enterprises of NAFTA Parties. It obliges relevant bodies to follow particular rules, to ensure transparency and to adhere to a "national treatment" obligation. Given that last point, there is—as we have seen above—the potential to generate conflict, for opponents could argue that the electrons are providing government services (lighting, heat, ventilation, etc.) and that it does not matter how they were created. This would, again, as we have seen above, open discussion related to the production and process methods of electricity generation. Perhaps more significantly, were any such program to favor "in-jurisdiction" green power, then a challenge on "national treatment" grounds might achieve greater traction.[12] Reviewing the Pennsylvania "Request for Quote for Electric Generation Attributes," it is interesting to note the following passage: "Attributes of the generation sources that are of interest include: the generating technology utilized, the generating capacity, the age of the source, and the location of the generating source" (Pennsylvania Governor's Green Government Council, 2004). Thus, challenges are certainly conceivable.[13]

Another area where politics across the border could arise is with respect to subsidies. Generally, the global trade and investment regime frowns upon subsidies.

Historically, however, subsidies have been central to energy activities, with fossil fuels and nuclear power, in particular, receiving millions of dollars in support in many countries, Canada and the United States included. While challenges to these subsidies, in order to promote the increased use of renewable energy, could conceivably arise, the well-entrenched (and universal) nature of these subsidies may mean that they do not attract such attention. Instead, subsidies (or, at least, claimed subsidies) to encourage renewable electricity may be the ones that come under scrutiny.

In Europe, there is an oft-cited debate about "prices versus quantities" with respect to supporting renewable electricity. In other words, should there be explicit prices for renewable electricity with the market determining the quantity provided or explicit quantities for renewable electricity with the market determining the price. While North America has conventionally favored the latter (usually in the form of a renewable portfolio standard), Europe has been much more eclectic in its approach, with both attracting attention. Relevant to the issue in this article, however, is the fact that this European trend appears to be moving to North America. In March 2006, some observers claimed that Ontario took the lead with respect to an approach representative of the former feed-in tariffs (or what is increasingly being called "standard offer contracts" in North America). At that time, the Government announced that "the Ontario Power Authority will purchase electricity produced by wind, biomass or small hydroelectric at a base price of 11 [Canadian] cents per kilowatt-hour. The fixed price for solar will be 42 [Canadian] cents per kilowatt-hour" (Ontario Ministry of Energy, 2006). Other jurisdictions in North America seem set to follow suit.[14]

A key precedent for determining the relationship between a feed-in tariff and international economic law comes from Germany in the PreussenElektra versus Schleswag case. In this instance, PreussenElektra, one of Germany's electricity suppliers, complained that it was paying too much for renewable electricity under the German feed-in tariff law, which requires suppliers to purchase renewable electricity within their area of supply at a set (premium) price. PreussenElektra maintained that the law violated European rules on subsidies, because it was in effect state aid. The European Court, however, disagreed and declared that this was not problematic because it did not constitute aid granted directly or indirectly through state resources. Instead, it was the private grid operators that were obliged to make the payments. This last point appears to be particularly consequential. Turning to this side of the Atlantic Ocean, while the details in the case of Ontario have yet to be worked out by the Ontario Power Authority, it is generally expected that the payments will be made by the government. Therefore, will it be able to seek the same kind of protection that sheltered Germany's feed-in tariff law? Moreover, it will also be interesting to see the details with respect to how would it be handled if someone in Buffalo, N.Y., put solar panels on their roof, and arranged for the electricity to be submitted to the Ontario grid, and demanded payment for it. How would the Ontario government react?

Finally, the emerging market for renewable-electricity certificates that is, for the environmental benefits of generating renewable electricity (often arising from the displacement of conventional, carbon-based electricity generation), as distinct from the electrons themselves poses another interesting issue for investigation. In different schemes around North America (and, indeed, around the world, with the European Union's carbon trading system representing the most ambitious such undertaking, globally), systems of tradable emission credits have been established as a means to address environmental concerns. Renewable-electricity certificates are closely related.

Worth noting here, with respect to the way in which the international trade of renewable-electricity certificates might stimulate discussion, is that they may be interpreted as financial services instead of electricity as a good, and may, therefore, point to different legal regimes in particular, the General Agreement on Trade in Services rather than the General Agreement on Tariffs and Trade (Howse and van Bork, 2006). Additionally, we should further recognize that the use of renewable electricity in place of fossil-powered electricity can serve to meet environmental challenges at a variety of different scales: reduced emissions of nitrogen oxides ameliorate smog challenges; fewer sulfur emissions lessen acid precipitation and lower carbon dioxide emissions serve to mitigate global climate change. Therefore, there might be a range of legislative obligations to which the act of encouraging renewable electricity is contributing; the fact that airsheds are often international simply adds another layer of complexity to this.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this article has been to examine the cross-border (Canada-United States) issues that are arising and could arise with respect to desires to increase the use of renewable electricity. Our review suggests that there are many more issues that could arise than those that are currently part of the political agenda, which is now dominated by the debate about large-scale hydropower.

Of course, these debates could also interact with climate change politics to a greater extent. Both Canada and the United States use carbon-intensive resources to generate their electricity at least in part, and to varying extents (see Table 1). Therefore, as efforts to develop climate change mitigation policies and programs continue at national and sub-national levels, development of renewable electricity sources will no doubt continue to be part of the discussions. This article has already suggested the links between the two: an additional example includes the work of the New England governors and Eastern Canadian premiers, where they see the promotion of renewable energy being part of their climate change goals (see Selin and VanDeveer, this volume). As such, the ways in which the kinds of potential debates could arise will, at least in part, be linked to the development of climate change developments both within Canada and the United States, as well as between the two countries.

The potential for international cooperation to assist the sustainable development of renewable energy is great (Rowlands, 2005). As such, it is important to anticipate and respond to disputes that could arise between countries, Canada and the United States included, as different players pursue the establishment of sustainable energy systems. However, a key challenge related to this issue is that both renewable electricity and global climate change are investigated by multiple organizations (and institutions) in many fora working at numerous levels. Indeed, given how energy and climate change issues permeate virtually every aspect of our modern society, this is not particularly surprising. Locally, there is increased attention to the way in which cities and other municipalities could be catalysts for a movement towards a new energy paradigm and a carbon-free future; similar discussions occur at the province or state-level. Nationally, countries have traditionally played a key role, particularly when international obligations are involved. Finally, as has been revealed through the investigation of Canada-U.S. relations in this article, the ways in which international bodies respond will also be pivotal. As such, while the links between energy issues particularly efforts to increase the use of renewable electricity, and climate change issues particularly mitigation plans, are evident, many challenges remain to be resolved and many opportunities are yet to be fully exploited.

NOTES

1. Electricity generation accounts for 2,100 MtC/yr (megatonnes carbon per year) or 37.5 percent of global carbon emissions (IPCC, 2001).

2. The figures for the individual countries are as follows: In 2003, 5.2 percent of the electricity generated in Canada was exported to the United States, while, in 2004, 0.6 percent of the electricity generated in the United States was exported to Canada.

3. For more information about the blackout, see U.S.-Canada Power System Outage Task Force (2003).

4. For related discussion regarding the potential benefits of cross-border (and NAFTA) cooperation on these issues, see Betsill, this volume.

5. Unless otherwise noted, information about specific renewable electricity policies in the United States is taken from the "Database of State Incentives for Renewable Energy" (see http://www.dsireusa.org).

6. One example comes from Vermont, which has a soon-to-expire long-term contract with Hydro-Québec. Some groups are using the debate surrounding the desirability of renewing the contract as an opportunity to encourage state-developed wind power (and other renewables) in its place. (See, for example, the campaigns of the Vermont Public Interest Research Group (VPIRG, 2006).) Of course, during the debates regarding the construction of new facilities in the 1980s and early 1990s, there was also extensive opposition (often with interesting transnational links between U.S. activist organisations and Canadian First Nations groups) (McRae, 2004).

7. Similar sentiments have been voiced by the Minnesota Environmental Action Network (http://www.mnaction.org).

8. Put another way: "... energy is inherently dynamic—it is a process of transformation. The product is the process" (Howse, 2005).

9. These two paragraphs build upon Rowlands (forthcoming).

10. In the Metalclad case, a U.S. waste management company challenged "decisions by Mexican local government to refuse it a permit to operate a hazardous waste landfill … and by state government to create an ecological preserve in the area" (CCPA (2004)). A NAFTA tribunal found in favor of the U.S. company, following Chapter 11 of the NAFTA.

11. What makes the potential Chapter 11 challenge all the more intriguing is that it would not need to be instituted by (or even supported by) the government in jurisdiction B; private companies have standing in such cases under NAFTA.

12. International lawyer Barry Appleton reviewed Ontario's Renewables "Request for Proposals" (a mechanism whereby it was seeking "bids" for long-term supplies of renewable electricity) for the Society of Professional Engineers. He argued that, by stipulating that generation had to be in Ontario, the province was setting itself up for an international trade challenge (Spears, 2005).

13. The differences in the definition of green power could affect international relations not only with respect to the kind of resource used to generate the electricity, but also with respect to the standards that apply to the manufacture and/or use of renewable energy technology. For example, one jurisdiction might prohibit the use of hazardous products in photovoltaic cells, or it might have particular levels of noise performance for wind turbines. The debate with respect to differences in definition could also manifest itself in discussions about labeling. This might not only include differing perspectives with respect to what qualifies as green power, but also whether goods made with green power could qualify for an environmental label or not.

14. Paul Gipe (2006) identifies California, Washington, Minnesota, and Wisconsin as being in the forefront in this regard.

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U.S. Business Strategies and Climate Change

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Business, especially large multinational corporations (MNCs), has *de facto* become a key part of the fabric of global environmental governance (Levy and Newell, 2005). In their role as investors, polluters, innovators, experts, manufacturers, lobbyists, and employers, corporations are central players in environmental issues. The recognition by governments and NGOs that large firms are not just polluters, but also possess the organizational, technological, and financial resources to address environmental problems, has stimulated consideration of ways to harness and direct these resources toward desirable goals. This acknowledgement of corporate potential has occurred, not entirely coincidentally, in a period of growing concern at a "governance deficit" at the international level (Haas, 2004; Newell and Levy, 2006; Slaughter, 2004).

Business has stepped into this breach with increasing enthusiasm. The International Chamber of Commerce (ICC), the largest multisector business association in the United States, has forcefully asserted a role as a legitimate actor in climate governance, based on societal dependence on business resources:

> Industry's involvement is a critical factor in the policy deliberations relating to climate change. It is industry that will meet the growing demands of consumers for goods and services. It is industry that develops and disseminates most of the world's technology…. It is industry, therefore, that will be called upon to implement and finance a substantial part of governments' climate change policies (International Chamber of Commerce, 1995).

During the 1990s, much of the energy of North American business, particularly in sectors related to fossil fuels, was directed toward preventing an international regime to impose caps on emissions of greenhouse gases (GHGs). More recently, business has adopted a more constructive stance that acknowledges the reality of climate change and its responsibility for addressing the issue (Margolick and Russell, 2004). A recent report from Ceres, a coalition of investors, firms, and environmental organizations, typifies the emerging optimistic view:

> Companies at the vanguard no longer question how much it will cost to reduce greenhouse gas emissions, but how much money they can make doing it. Financial markets are starting to reward companies that are moving ahead on climate change, while those lagging behind are being assigned more risk… Shareholders and financial analysts will increasingly assign value to companies that prepare for and capitalize on business opportunities posed by climate change (Cogan, 2006).

Ceres lists five key ways in which many companies are responding more positively to climate change (Cogan, 2006): they are establishing climate change task forces to integrate responses across functions, divisions, management levels, and countries; they are articulating their positions in their communications with the public and policymakers; they are disclosing climate-related risks and opportunities in financial and other documents; they are developing accounting systems for tracking emissions and projecting savings relative to a baseline; and they are incorporating climate change into strategic planning processes that affect resource allocation for research and development, production, and marketing.

High-profile corporate initiatives, such as "Beyond Petroleum" from BP and "Ecoimagination" from GE, buttress the view that business is taking climate change seriously. These initiatives generally entail substantial public relations and advertising efforts to re-brand the companies as green, particularly around climate change, combined with substantial investments in research and development for low-emission technologies and products. Corporate action appears to be diffusing rapidly. The Pew Center and The Climate Group, two organizations dedicated to promoting business action on climate change, have documented positive steps taken by numerous companies as well as the consequent financial and environmental benefits (Margolick and Russell, 2004; The Climate Group, 2005).

Several private initiatives have been established to create carbon-trading systems among participating companies. The World Bank Prototype Carbon Fund (PCF) was established in 2000 as a public-private partnership between a few national governments, including the Netherlands, Sweden, Japan, and Canada, and 26 companies, including Hydro-Québec, Daimler-Chrysler, Shell-Canada, BP-Amoco, and numerous Japanese firms. The Chicago Climate Exchange opened in October 2003 with 22 members, including American Electric Power and Ford. The members have committed to reducing emissions from North American operations by one percent a year for four years, and can engage in trading to meet those commitments.

All this corporate activity presents a significant paradox, as global GHG emissions are still accelerating and many countries are likely to miss their Kyoto targets (UNDP, 2004). Some have claimed that corporate actions are primarily public relations efforts with little substance, though the detailed case studies by Pew, WRI, and other groups do substantiate real investments and organizational changes. Of course, it will take time for corporate investments to bear fruit, and some sectors will find it harder to achieve emission reductions than others; Ceres notes that climate change is still widely ignored in major industrial sectors such as coal and airline companies (Cogan, 2006).

More puzzling is the resurgence of corporate political activity in the United States against climate policy initiatives, particularly those emerging at the state level. The U.S. auto industry, despite the introduction of new hybrid models in 2006, continues to oppose raising CAFE standards or their extension to heavier vehicles (Hakkim, 2005b), and is vigorously contesting efforts by California and New York to exert direct regulatory control over vehicular carbon emissions (Hakkim, 2005a). Corporate lobbying has been implicated in the withdrawal by Massachusetts from a proposed Regional Greenhouse Gas Initiative in early 2006 (VanDeveer and Selin, 2006). The Competitive Enterprise Institute (CEI), an industry think tank began running ads in May 2006 attacking the concept of carbon dioxide as a pollutant (Zabarenko, 2006). Another business-oriented group, the American Legislative Exchange Council (ALEC), has been developing model legislation at the state level to limit regulation of GHGs, and

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claims almost a third of all legislators in the country as participants (Greenblatt, 2003; Rabe, 2006).

The remainder of this paper traces the history and current state of business responses to climate change and explores in more depth the paradoxical contrast between, on the one hand, a beehive of business activity on climate change, and on the other, continued business opposition to mandatory measures despite accelerating emissions. The argument advanced here is that North American business is prepared to take action consistent with a weak, fragmented, and largely voluntary carbon regime; indeed, North American business has been instrumental in constructing this regime. These actions include considerable organizational and technological preparations for a carbon constrained future, but they envisage a long-term transition that does not immediately threaten core business activities. However, as North American policy initiatives shift to the state level, business in affected sectors is organizing to oppose regulatory initiatives likely to become models for more stringent and mandatory federal policy.

HISTORY OF CORPORATE RESPONSES TO CLIMATE CHANGE

Climate change presents a profound strategic challenge to firms. Despite the considerable attention given to potential economic opportunities, the primary issue facing many sectors is the "regulatory risk" of higher costs for fuels and other inputs, and lower demand for energy-intense products (Wellington and Sauer 2005). Measures to control the emissions of GHGs most directly threaten sectors that produce and depend on fossil fuels, including coal, oil, autos, and airlines. Other energy-intense sectors include cement, paper, and aluminum. Companies also face considerable competitive risk as changes in prices, technologies, and demand patterns disrupt sectors and entire supply chains. Investments in research and development are highly risky, as low-emission technologies, such as those for renewable energy, frequently require radically new capabilities that threaten to undermine the position of existing companies and open the industries to new entrants (Anderson and Tushman, 1990; Christensen, 1997). Moreover, the unpredictable path of technological evolution makes the task of choosing among competing technologies a treacherous business.

It is therefore not surprising that a wide range of sectors responded aggressively to the prospect of regulation of GHG emissions. During the 1990s, U.S.-based companies were particularly active in challenging climate science, pointing to the potentially high economic costs of greenhouse gas controls and lobbying government at various levels. Businesses from across the range of affected sectors formed a strong issue-specific organization, the Global Climate Coalition, to coordinate lobbying and public relations strategies (Gelbspan, 1997; Leggett, 2000; Levy and Egan, 2003). Meanwhile, U.S. energy and auto companies invested little in new technologies that could deliver short- to medium-term reductions in emissions (Levy, 2005).

European industry was far less aggressive in responding to the issue and displayed a greater readiness to invest in technologies that might reduce greenhouse gas emissions. These divergent strategies defy simple explanation, particularly in the oil industry, where companies on both sides of the Atlantic are large, integrated multinationals with similar global profiles and strategic capabilities (Rowlands, 2000). Studies of the oil and automobile industries have pointed to the institutional environment of these firms as important determinants of their strategic responses (Levy and Kolk, 2002; Levy and Rothenberg, 2002; van de Wateringen, 2005). Corporate strategies are driven by perceptions of economic interest that are mediated by the different cultural, political, and competitive landscapes in the United States and Europe. Expectations concerning markets, technologies, regulatory responses, consumer behavior, and competitor reactions varied among the companies according to their individual histories, the location of their headquarters, and membership in particular industry organizations. Senior managers of European companies tended to believe that climate change was a serious problem and that regulation of emissions was inevitable, but were more optimistic about the prospects for new technologies. U.S. companies, by contrast, tended to be more skeptical concerning the science, more pessimistic regarding the market potential of new technologies, and more confident of their political capacity to block regulation. Moreover, several large U.S. companies in the oil and auto industries had lost substantial amounts of money in investments in renewable energy and electric vehicles in the 1970s, and were very reluctant to repeat these experiences.

> ...as North American policy initiatives shift to the state level, business in affected sectors is organizing to oppose regulatory initiatives likely to become models for more stringent and mandatory federal policy.

By 2000, a convergent trend could be discerned as key firms on both sides of the Atlantic moved toward a more accommodative position that acknowledged the role of GHGs in climate change and the need for some action by governments and companies. In the oil and automobile industries, companies were beginning to invest substantial amounts in low-emission technologies, and were engaging a variety of voluntary schemes to inventory, curtail, and trade carbon emissions. No obvious dramatic scientific, technological, or regulatory developments can account for these changes, but Levy (2005) has pointed to a number of factors that produced some convergence in corporate perceptions of the climate issue and their interests. Most significantly, MNCs are located in global industries with cognitive, normative, and regulatory pressures inducing some measure of convergence (Scott and Meyer, 1994).

The impact of MNCs' countries of origin on corporate strategies is likely to diminish over time as industries become more international in scope. Given the keen awareness of interdependence, companies are likely to copy each others' moves to prevent rivals gaining undue advantage (Chen and Miller, 1994). Industry interdependence also takes a collaborative form within industry associations and in a number of alliances and joint ventures. Executives read the same trade journals and the same studies of industry trends. The emergence of climate change as a "global issues arena" itself constitutes an institutional context that provides some convergent pressure. MNCs have little choice but to develop unified company-wide positions toward such issues, even when some subsidiaries dissent from the corporate stance. Indeed, most of the large MNCs in the automobile and oil sectors have formed internal, cross-functional "climate teams" for precisely this purpose. The senior managers responsible for climate-related strategy know each other well and meet regularly at the international negotiations and at other conferences and industry-level activities.

The shift in the position of U.S. industry can also be linked to changing competitive dynamics, strategic miscalculations, the evolution of new organizations supportive of a proactive industry role, and the diffusion of "win-win" discourse articulating the consonance of environmental and business interests. Efforts by the Global Climate Coalition and other industry groups to challenge the science sometimes produced a damaging backlash. Environmental groups in Europe and the United States issued a number of reports that noted industry support for some climate skeptics, and attempted to frame the issue as big business using its money and power to distort the scientific debate (Corporate Europe Observatory, 1997; Gelbspan, 1997; Hamilton, 1998). The growth of new organizations committed to a climate compromise further undermined the GCC's claim to be *the* voice of industry on climate. Eileen Claussen, a former U.S. Assistant Secretary of State for Environmental Affairs and negotiator at the climate change negotiations, formed the Pew Center on Global Climate Change in April 1998. The Pew Center provides not only a channel of policy influence for member companies, but also a vehicle for legitimizing the new position. Other companies in sectors associated with low-carbon technologies have increasingly exerted their collective voice. The Business Council for Sustainable Energy, for example, which has affiliates in the United States and Europe, represents insulation manufacturers and the fragmented renewable energy sector. Increasingly, however, it has attracted larger companies engaged in natural gas and electronic controls, including Honeywell, Enron, and Maytag.

These organizational realignments have been accompanied by the growth of the "win-win" discourse of ecological modernization (Hajer, 1995) and a broader acceptance of the precautionary principle. The need to reconcile economic strategy with the case for precautionary action makes win-win language very attractive.

Ecological modernization puts its faith in the technological, organizational, and financial resources of the private sector, voluntary partnerships between government agencies and business, flexible market-based measures, and the application of environmental management techniques (Casten, 1998; Hart, 1997; Schmidheiny 1992). The concept is reinforced by claims of significant cost savings, such as BP's announcement in January 2003 that its success in reducing emissions by 10 percent relative to 1990 had also generated $600 million in cost savings.

The win-win paradigm is a key discursive foundation for a broad coalition of actors supporting the emerging climate compromise. A number of environmentally-oriented business associations, such as the Business Council for Sustainable Energy and the World Business Council for Sustainable Development, have adopted this language. Influential environmental NGOs in the United States, especially the World Resources Institute and Environmental Defense (Dudek, 1996) have initiated partnerships with business to pursue profitable opportunities for emission reductions. Governmental agencies find win-win rhetoric attractive for reducing conflict in policymaking. In the United States, the joint EPA/Department of Energy Climate Wise program describes itself as "a unique partnership that can help you turn energy efficiency and environmental performance into a corporate asset" (U.S. DoE, 1996).

On the economic level, competitive pressures and interdependence have compelled companies to respond to each other's moves. For example, Toyota's commercial launch of the Prius, a hybrid electric-small-gasoline-engine car, in the Japanese market in 1998, took the industry somewhat by surprise. Most U.S. executives were initially dismissive of the prospects for the car in the United States, recalling that GM's electric vehicle had generated much attention but very few orders when the car was launched in late 1995. Nevertheless, the U.S. auto companies were nervous that they might fall behind a competitor, and announced plans for their own hybrid vehicles, a number of which were launched in 2006.

In the oil industry, Exxon's recalcitrant position can perhaps be explained in terms of idiosyncratic firm-specific factors. A highly-regarded internal scientist has played a leading role in the company's climate strategy, the company's tightly centralized structure has allowed for few dissenting voices, and its strong financial position provides little pressure for change. Texaco, by contrast, felt compelled to reevaluate its strategy as oil prices fell below $15 a barrel at the end of the 1990s. Recently, however, even Exxon appears to be softening its stance.

CURRENT BUSINESS POSITIONS ON CLIMATE CHANGE

Among the many indicators of corporate response are reports by outside organizations that rate firms or document their achievements. Three of these are analyzed here: reports by the environmental group Ceres (Cogan, 2006), The Climate Group (2005), and the Pew Center on Global Climate Change's Business Environmental Leadership Council (BELC) (Pew, 2006). These reports have different criteria for inclusion and evaluation, but overlap in coverage helps to provide a reasonable indicator of corporate responses. Cogan (2006) profiled 100 of the largest firms in 10 carbon-intense industries from energy, industrial, and transportation sectors. All firms have significant U.S. operations, but are headquartered in various countries, except for the electric power industry, which includes U.S. firms only. Cogan assessed corporate governance on climate change based on board oversight, management execution, public disclosure, emissions accounting, and strategic planning. The companies were scored with a 100-point checklist, with a mean score of 48.5.

The Climate Group (2005) describes the achievements of 74 companies that have made measurable progress on GHG emissions or other climate-related action and have benefited financially from doing so. The data is derived mostly from the companies themselves, and inclusion is based on cooperation. The Pew Center's Business Environmental Leadership Council (BELC) is a membership organization. Membership requires a commitment to supporting climate change science and the responsibility of the business community to take action. Their website (Pew, 2006) lists company profiles, goals and achievements. Joining the Pew Center is a response strategy that was originally an action in opposition to the anti-Kyoto Global Climate Coalition.

The Ceres rankings point to the relatively poor performance of North American companies. Note that the emphasis here is on management and reporting rather than emissions. The "top ten" list includes four companies from

North America, five from Europe, and one from Japan (Table 1). North American firms are somewhat under-represented among the best performers, and all the bottom twelve companies are from the United States (Table 2).

Ceres also found significant differences between industries. In general, chemicals, electric power, and automotive firms have the highest scores; air transport, food, coal, and oil the lowest; and industrial equipment, metals, and forest products in the middle. However, the differences between firms within industries are much greater than the differences between industries: the oil industry contains both the highest and lowest scores.

TABLE 1: Top Ten Firms in Corporate Governance, Rated by Ceres

BP	Oil and Gas	United Kingdom	90
DuPont	Chemicals	United States	85
Royal Dutch Shell	Oil and Gas	Netherlands	79
Alcan	Metals	Canada	77
Alcoa	Metals	United States	74
AEP	Electric Power	United States	73
Cinergy	Electric Power	United States	73
Statoil	Oil and Gas	Norway	72
Bayer	Chemicals	Germany	71
Nippon Steel	Metals	Japan	67

TABLE 2: Bottom Twelve Firms in Corporate Governance, Rated by Ceres

UAL	Airline	United States	3
Williams	Oil and Gas	United States	3
ConAgra	Food	United States	4
Bunge	Food	United States	5
Foundation	Coal	United States	5
Southwest	Airline	United States	6
Murphy	Oil and Gas	United States	6
Phelps Dodge	Metals	United States	6
Arch	Coal	United States	8
AMR	Airline	United States	9
PepsiCo	Food	United States	9
El Paso	Oil and Gas	United States	9

Source: Cogan, 2006

In the oil industry, four European companies (BP, Royal Dutch Shell, Statoil, and Total) all rank well above their North American counterparts in climate governance. BP, Total, and Shell have documented real reductions in carbon emissions (The Climate Group, 2005) and both BP and Shell are members of the BELC (Pew, 2006). In contrast, among U.S. oil companies, only Chevron ranks above average on the Ceres report, only Sunoco is a member of the Pew group, and no U.S. oil firm appears in The Climate Group study. Similarly, the London-based coal and minerals company Rio Tinto scores above average on Ceres and is a member of the BELC, while no U.S. coal producer has any positive indicators in terms of corporate response to climate change.

The metals and mining industry clusters into three groups, but not purely along home country lines. The aluminum industry is dominated by North American firms (International Aluminium Institute, 2006). Alcan in Canada and Alcoa in the United States both rate highly in climate leadership (Cogan, 2006), participate in the Business Environmental Leadership Council, and have documented large reductions in GHG emissions below 1990 levels (The Climate Group, 2005). Three overseas steel firms, Nippon of Japan, BHP Billington in Australia, and Anglo American in the United Kingdom, have above average Ceres scores; and the U.S. steel industry plus Mittal Steel of the Netherlands have very low Ceres scores. The good performance of aluminum manufacturers can be explained, in part, by the high energy-intensity of the traditional process, which presents more opportunities for reducing GHG emissions and for cost savings.

The automotive industry also groups into three clusters, largely on the basis of nationality. Japan-based Toyota and Honda rate well, according to Ceres, and have large emission reductions documented by The Climate Group; U.S.-based Ford and General Motors are above average according to Ceres, and GM has modest achievements in the Climate Group report; the German manufacturers Daimler, Volkswagen, and BMW all have below average Ceres scores. In contrast with these indicators, it is noteworthy that the European Union has much more stringent fuel-efficiency standards than either the United States or Canada, and European manufacturers as a group use advanced diesel technology and lighter cars to achieve substantial efficiency improvements (An and Sauer, 2004; Levy and Rothenberg, 2002).

Several companies and sectors have ambiguous indicators. For example, Japanese auto manufacturer Nissan has a corporate governance score below the German manufacturers the lowest-rated automaker by Ceres. Yet it has documented reductions in GHG emissions that place the company on par with the highly-ranked Toyota and Honda (The Climate Group, 2005). Among industrial equipment manufacturers, large U.S. and European firms (Swiss ABB, GE, and UTC in the United States) are noted for their corporate governance (Cogan, 2006; Pew, 2006), but poorly-ranked Caterpillar has documented greater GHG reductions than UTC, while ABB and GE do not appear in The Climate Group report. These inconsistencies point to the difficulty in assessing and comparing corporate responses to climate change.

PROBING THE PARADOX

While North American companies increasingly realize that climate change is a long-term issue to which they will need to develop market and technological responses, in the short term they face a weak and fragmented regime that offers only modest economic incentives for strong action. The emerging international climate regime comprises a relatively loose system of international governance involving significant contestation as well as collaboration among states, firms, nongovernmental organizations (NGOs) and multilateral institutions (Levy and Prakesh, 2003; Newell and Levy, 2006). Within this system, states act as economic agents concerned about their competitiveness (Cerny, 1997), while firms are important political actors with significant policy influence. The fragmentation and flexibility of the current governance system has facilitated its evolution but is also a fundamental source of weakness.

The specific mechanisms and targets agreed by the parties to the Kyoto Protocol helped to bring reluctant countries on board and accommodate industry opposition. The main elements of the Protocol include mandatory-but-modest emission targets, which are substantially weakened by broad and flexible mechanisms for implementation and weak enforcement (Grubb, Vrolijk, and Brack, 1999). The inclusion of carbon sinks introduces considerable uncertainty

and room for creative accounting, and the ability to buy carbon credits in international emission trading schemes enables countries of the former Soviet Union to sell large amounts of "hot air" credits. The Clean Development Mechanism and Joint Implementation further reduce the burden of adjustment.

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Many argue that Kyoto is fast becoming irrelevant, and that the more significant regime structures are growing organically from the initiatives of NGOs, companies, and authorities at multiple levels (Lee, 2003). More than half the states in the United States are addressing climate change in some manner; many are drafting climate change action plans and enacting renewable portfolio standards, which require a growing percentage of electricity generation to be from renewable sources (Rabe, 2006). Eight northeastern states are implementing an ambitious regional carbon cap-and-trade system for power generators. California's legislature in 2002 began the process of regulating carbon emissions from automobiles; New York and nine other states have announced their intention to follow suit. The European Trading Scheme (ETS), a carbon cap-and-trade system, commenced operation in January 2005 and covers the power, iron, steel glass, cement, ceramic, pulp, and paper industries.

While the momentum of this fragmented multi-faceted regime is clearly gathering pace, there is not yet a firm regulatory or economic incentive for firms to adopt radical changes in their strategies. Initial trades on the Chicago Climate Exchange have been priced very cheaply, at just under $1 per ton of carbon dioxide, suggesting that the cap is not very stringent. The RGGI program in the northeastern United States will most likely include a safety valve designed to prevent the price of carbon credits from exceeding $10 a ton (VanDeveer and Selin, 2006), which is insufficient to drive substantial innovation or efficiency measures. Unlike the ETS, RGGI only covers the power sector and has modest emission reduction goals, consisting of stabilization in the 2009 to 2015 period, and annual cuts of 2.5 percent thereafter. In Europe, carbon prices have fallen to around $15 per ton after spiking in 2005.

The efforts of European oil companies exemplify the paradox of substantial climate-related activity with little fundamental change. BP and Shell have each committed to invest more than $1 billion in renewable energy, and have been particularly active in promoting their efforts in the media. Nevertheless, these new businesses are miniscule in comparison with their core oil and gas operations, which continue to grow (The Climate Group, 2005). Oil MNCs on both sides of the Atlantic have converged on the view that constraints on carbon are not likely to present a serious threat. Oil production is expected to peak around 2020 to 2030, with a slow subsequent decline; at higher prices, vast reserves of oil shale and deeper ocean sources become viable. All the oil companies are well diversified into natural gas, the demand for which is booming—primarily for power generation, while renewables are not expected to pose major threat before mid-century due to cost and infrastructure limitations. Oil is used primarily for transportation, with no commercially feasible substitutes on the horizon, and any improvements in fuel efficiency are more than offset by growth in vehicle sales and miles traveled, particularly in developing countries. Biofuels such as ethanol from corn can slowly be incorporated into existing infrastructure and business models. Air transportation is also growing rapidly, and in any event is not covered by Kyoto.

Much of the corporate activity on climate change is stimulated by the perception of long-term market opportunities in new high-margin, low-emission products and technologies, as well as cost savings from lower energy use (Begg, van der Woerd, and Levy, 2005; Margolick and Russell, 2004; Reinhardt, 2000; Romm, 1999). The development of markets for trading carbon credits presents a further stimulus. Several groups, such as the Investor Network on Climate Risk and The Climate Group, have played an important role recently in highlighting the

financial risks and opportunities facing various sectors and encourage companies to assess and manage these risks rather than ignore them (The Climate Group, 2005). A more proactive stance is likely to provide companies with some protection against litigation and damage to their reputation and litigation (Wellington and Sauer, 2005), as well as more influence in shaping the detailed mechanisms of climate-governance systems, such as allocation and trading of carbon credits.

Some substantial business opportunities clearly do exist. The rapid growth of markets for renewable and clean energy, and for energy efficiency, is one example. Global markets for wind, solar photovoltaic (PV), and fuel cell power are growing at an annual rate of approximately 20 percent, and are forecast to reach $115 billion by 2015, from a 2005 base of only $24 billion (Makower, Pernick, and Wilder, 2006). Markets for associated electronics, materials, construction, and services will also experience rapid growth. The global market for energy efficiency products, currently estimated at $115 billion, is projected to grow to over $150 billion by the end of this decade. These markets, however, present substantial market and technological risks, and many of the small firms active in these areas are currently in a precarious financial position. In other sectors, the incentives for action are even less clear. In the insurance industry, for example, despite rising insured losses that many attribute to climate change, major North American firms are reluctant to take action on the issue due to a tradition of conservatism, relying on the federal government for disaster relief, and the lack of clear financial benefits from action (Haufler, 2006).

When the United States first agreed to a binding international agreement in Geneva in July 1996, it provided an explicit assurance that industry interests would be integrated into the climate regime. Chief negotiator Tim Wirth promised that the United States would pursue "market-based solutions that are flexible and cost-effective," and that "meeting this challenge requires that the genius of the private sector be brought to bear on the challenge of developing the technologies that are necessary to ensure our long term environmental and economic prosperity" (Wirth, 1996). The emergent regime is sufficiently weak and flexible that it does indeed accommodate most business concerns about short-term disruption to markets, and many firms appear willing to engage in substantial organizational and technological efforts to work toward a long-term carbon constrained future. their bets by investing in long-term alternatives while acting to preserve the value of their technological and market assets in the short to medium term. Simultaneously, however, the locus of regulatory activity is moving to the state level in the United States, and when these policy initiatives threaten to impose more stringent caps on emissions and to create a model for national regulation, business is reverting to its oppositional stance of the 1990s. It remains to be seen whether the current skirmishes are the beginning of round two of the climate wars.

> "In a sense, companies are hedging their bets by investing in long-term alternatives while acting to preserve the value of their technological and market assets in the short- to medium-term.

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Insurance and Reinsurance in a Changing Climate

VIRGINIA HAUFLER[1]

INSURANCE AND THE RISKS OF CLIMATE CHANGE

After Hurricanes Dennis, Katrina, Rita, and Wilma, insurance companies are withdrawing from coastal markets in the United States (*The Economist*, 2006). They fear the financially disastrous combination of severe weather trends with population growth in urban areas. One recent news report stated, "Some believe the two are creating a risk of losses so large that insurers could be pushed to the breaking point..." (Hsu, 2006). The industry has three primary methods of responding to "excessive" risk: by raising prices for what it sells; by withdrawing from product lines and markets; and by changing the financial, legal, organizational, and political practices of the industry. All three serve to protect the bottom line of insurers but may or may not serve a wider public interest.[2]

Insurers often withdraw from a particular geographic or product market, either temporarily or permanently, when losses are too high. This leaves people and property without any recourse in a disaster except to draw on the public treasury. In coastal areas of the United States, state-backed insurance plans are being overwhelmed by new applications (*The Economist*, 2006). When one person loses their house and has no insurance, they must dig into their own personal resources to rebuild. But when thousands of people lose their houses in a disaster, then government must step in to provide the resources to rebuild entire communities. Insurers may raise their prices to recover from severe losses and rebuild their own reserves, but this will drive people away from purchasing insurance. Again, the gap in coverage may need to be filled by public spending. Alternatively, insurers may pursue legal and organizational changes to limit their own losses, for instance, by shifting financial risk to other institutions, or redefining and litigating contract terms to put a bottom line beneath industry losses. In the case of environmental pollution, many insurers sought to limit their legal liability in order to avoid paying certain claims from decades-old contracts, though in most cases in the United States they lost in court. Finally, insurers may design contract terms that provide incentives for customers to change their behavior in a way that limits the potential for losses and reduces moral hazard. For instance, the price (premium) for fire insurance will be lower for people who do not smoke cigarettes or who install smoke detectors. All three responses are in play with regard to climate change risk, but only the last one provides a mechanism to reduce or prevent climate change itself instead of responding to its effects. Yet, for reasons that will be discussed below, the latter option is the one that has the least amount of support within the industry so far.

The global climate change issue is complex, and has gone through a period of hot contestation to one in which many of the main issues have been settled. There is now general agreement that global warming is occurring and that human activities contribute to it. The predicted effects of climate change will cause sea levels to rise, modify

ocean circulation, and change marine ecosystems. All of these changes will have a significant effect on the North American continent. They will place increased stress on coastal resources and could threaten the existence of low-lying islands including Manhattan. There are areas of New Orleans that some experts believe should not be rebuilt because the land is too low and will flood again as global warming increases. Some agriculturally productive regions in the plains regions of the United States and Canada may experience severe droughts, and the "breadbasket" of North America may become a parched wasteland. Coastal resort areas of Mexico may be affected by rising waters as the glaciers of the Pacific Northwest, Alaska, and the Arctic Circle shrink from warmer weather patterns. Pressure on habitats is increasing, as we see already in the spread of insects out of southern regions of the continent farther north. Diseases common to warmer southern areas, such as malaria, may spread to the north (Stone, 1992).

All of these consequences of global warming pose increased risk of loss to property and commerce, and in turn, to those who insure against risk. Just about every type of insurance may be affected: obviously property insurance, due to weather-related damage, but also including health and life insurance, as diseases spread into new geographic areas. More specialized insurance also may be affected. For instance, companies selling directors' and officers' liability insurance may have to take into account the impact of shareholder lawsuits brought for breach of fiduciary duty if the directors and officers do nothing to prepare for or prevent climate change. The insurance sector itself is one of the largest institutional investors in the world, and changes in climate and weather patterns will affect insurers' decisions on where to invest, and what rate of return they receive. The impact of climate change will not be all negative for insurers, however. There are also opportunities for the more entrepreneurial insurers as they devise new products that build upon climate mitigation policies and programs, for instance, insurance for risks involved in trading carbon credits via newly established exchange mechanisms.

THE INSURANCE INDUSTRY: RECOGNIZING THE PROBLEM

Insurance, in its most fundamental form, is a mechanism for transferring financial risk. The insurance firm obtains payment in the form of premiums, and the customer receives in return a promise that the insurer will provide a payment when a specified risk occurs. Economic historians point to the development of institutions to manage risk as a key facilitator in the expansion and development of the modern economy (North, 1990). The insurance industry is composed of many different types, or "lines," of insurance, including life, health, property and casualty, auto, and various specialized forms of insurance such as political risk or directors' and officers' liability. The industry includes the direct insurers (companies and agents) who sell to customers; brokers who bring customers and insurers together; adjusters who evaluate and administer claims; and reinsurers who provide insurance to the direct insurers. In addition, there are many different service providers, from rating agencies to specialist insurance providers.

The main hubs of insurance activity are in London and New York, with big reinsurers based in Germany and Switzerland, and one of the biggest direct insurers coming out of Tokyo. In North America, the big insurers are based in the United States, in the northeast. Most insurance is regulated at the state level, though the industry has experienced national consolidation and international mergers and acquisitions. The Canadian market is similar to that in the United States, though certain types of insurance are provided by provincial governments, and there is more extensive federal regulation. In addition, most insurance is sold through brokers, with local branches of international firms (e.g., Marsh Canada Ltd.) (Keller and Amodeo, 2001). The Mexican insurance market is dominated by five companies prominent in auto, life, and property insurance; all have experienced significant foreign investment in recent years. As in many developing countries, the insurance market is underdeveloped, and most risks are not insured and simply become losses (Kreimer, Arnold, et al., 1999). The main natural risk for both Canada and Mexico is the danger of earthquakes while the United States faces a higher degree of flood risk. In general, the major reinsurance companies operate internationally, with companies such as Munich Re active in all three markets. Local markets and international ones are intertwined, so that severe losses from storms in the

TABLE 1: Highlights of 2005 Weather

1. Hurricane Vince was the first ever hurricane to approach Europe making landfall in Spain in October. It was also the most eastern and northern hurricane ever seen.
2. On 26 July, the meteorological station at Santa Cruz in north Mumbai, India recorded 944mm of rain in 24 hours. This was the highest precipitation ever recorded in India.
3. Hurricane Wilma, which formed in the Caribbean in October, was the strongest hurricane ever monitored. It had a core pressure of 882 millibars and caused devastation in Cozumel and Yucatan. Economic losses have been calculated at $15 billion with insured losses of $10 billion.
4. At the end of November, tropical storm Delta hit the Canary Islands, killing several people and leaving tens of thousands without electricity. It was the first tropical storm to ever strike the islands.
5. The number of tropical storms broke all records in 2005. By December 1, there had been 26, or 5 more than previous record of 21. Fourteen of these 26 tropical storms were classified as hurricanes.
6. Hurricane Katrina has been the most costly weather-related disaster ever with economic losses totaling more than $126 billion and more than $30 billion in insured losses.

UNEP, *2005 Breaks a String of Disastrous Weather Records* (http://www.unep.org)

Gulf can reduce the amount of insurance available in the Great Plains of Canada.

The insurance industry began to consider man-made climate change a threat to its health following a series of weather-related disasters in the 1980s and 1990s, such as hurricanes and floods, which have since only grown worse. The property-casualty insurers experienced what were then considered to be record-breaking losses, and the trend since then has been continually upward. In both 1995 and 1996, the losses broke all previous records.[3] In comparison to the 1960s, the 1980s had 3.1 times more overall economic losses from major natural disasters; 4.8 times more insured losses; and 5.0 times as many major catastrophes, (1993). We have about 5.5 times as many weather-related natural disasters today on a global basis than 40 years ago (Mills, Lecomte, et al., 2001). In 2004, global losses linked to weather totaled $145 billion, with insurers covering $45 billion. In 2005, weather related losses topped $200 billion and insured losses were around $70 billion (UNEP, 2005) (see Table 1). For North America, 2005 was a truly disastrous year, with Hurricanes Dennis, Katrina, and Rita causing a combined $154 billion in losses; Katrina alone caused a stunning $135 billion loss (Swiss Re, 2006). Global weather-related losses have been trending upwards, and these trends outstrip increases in population or inflation or non-weather-related events (Berkeley Lab, 2006). Some observers estimate that, worldwide, the losses are a staggering $80 billion each year, although only around $20 billion are actually insured (Krotz, 2005). This year, hurricane forecasters in the United States are predicting there will be five major storms of Category 3, with a chance of landfall around 81 percent compared to a 100-year average of only 52 percent–which means that issues related to weather will not be going away anytime soon, no matter what anyone believes about global warming (Hsu, 2006).

One notable feature of the insurance-sector response to climate change issues is the significant variation between European and U.S. insurance cultures.[4] In Europe, the insurance industry has been more proactive in changing their policies to respond to climate change, and in pressing governments to act on this issue. This can be explained in part by the differences in business-society relations between the United States and continental European states. As Levy argues more generally, the institutional environment influences how businesses respond to change (Levy, 2006). Business has tended to accept a larger role in social issues in Europe because of a history of corporatism, social welfare, and high expectations from society. European insurers are

more willing to invest in the kind of research data and model development that generate new knowledge, understanding, and underwriting standards than are U.S. firms. U.S. firms are limited to some degree by intensely competitive and shareholder-driven markets that punish firms immediately for performing below expectations; and a legal and regulatory that limits their ability to use new techniques and pricing structures (discussed below). It is the European insurance sector that has attempted to initiate new actions, working with governments and international organizations to develop a better understanding of the issues and the potential role of the insurance sector. However, some observers have noted that even the more progressive European insurers have not acted strongly to mitigate climate change, despite their rhetoric (Mills, Lecomte, et al., 2001). And, despite the hand-wringing over the high cost of recent disasters, the last few years have been some of the most profitable for U.S. insurers, in part because the losses were borne by overseas firms or reinsurers, who buffer their risk with returns on their investments in global capital markets (Hsu, 2006).

Reports of unusually severe natural disasters and dire effects on insurance profitability and even solvency began to appear in business journals in the 1980s. At the World Insurance Congress in July 1991, a representative of Continental Corporation noted that 1989 and 1990 were both record-breaking years for catastrophe losses; she mentioned the possibility this might be related to global warming but did not take a definitive stance (Souter, 1991). In 1992, the Munich Re corporation assessed losses that year as involving more than 500 natural catastrophes, 100 more than in the previous year. Swiss Re did an analysis demonstrating the size and frequency of catastrophes had been increasing (Gordes, 1997). Insurers became increasingly reluctant by 1993 to provide insurance coverage in areas subject to these natural disasters, including many island states (*Environment*, 1993). These early 1990s reports stimulated discussion within the insurance industry of the relationship between extreme-weather risks, climate change risks, and insurance.

The entrepreneurial Jeremy Leggett of Greenpeace International was one of the first to make the link between insurance losses and global warming. In 1992, he began to urge the insurance industry to take action against global warming, making numerous presentations at industry conferences (McIwaine, 1992). He published a widely noticed article citing those earlier insurance studies and linking their results to climate change in an effort to mobilize insurers (Leggett, 1993). In his manifesto, he argued that the standard response of raising premium rates and deductibles, and restricting the terms and conditions for insurance policies, was a short-sighted solution to a major problem. He believed the long-term health of the industry depended on reducing greenhouse gas emissions to prevent, and not accommodate, climate change. At this time, Greenpeace was looking for a business group to organize in opposition to the fossil-fuel interests that adamantly resisted efforts to limit carbon emissions (Sabar, 1994b; Gordes, 1997). Leggett cited numerous statements by insurers that indicated a growing concern among some of them that indeed climate change was implicated in their current losses or could potentially become a severe problem in the future (Leggett, 1993; Gordes, 1997).

Munich Re, the largest reinsurance company in the world, called on governments in 1994 to stabilize greenhouse gas emissions and keep their Rio commitments (Abbott, 1994). A year later, just prior to the Berlin IPCC conference, Munich Re reported on further natural disasters, linked them to possible global warming, and called for a reduction in carbon emissions. Gerhard Berz of Munich Re stated that "There is no longer any doubt to us that a warming of the atmosphere and oceans is causing an increased likelihood of storms, tidal waves, hailstorms, floods and other extreme events" (Thiel, 1995). In what amounted to a call to action, in 1995 H. R. Kaufman, general manager of Swiss Re, stated, "There is a significant body of scientific evidence indicating that last year's record insured loss from natural catastrophes was not a random occurrence...Failure to act would leave the industry and its policyholders vulnerable to truly disastrous consequences" (*Environment*, 1995). At the Berlin conference itself, representatives of Munich Re, Swiss Re, and Lloyd's of London lobbied for emission reductions, in the hope this would decrease the probability that the number of natural disasters would go up.

The major Norwegian insurer, Uni Storebrand, began lobbying other companies in Switzerland, Germany, and Britain to organize more actively on climate change issues and participate in international negotiations. Uni Storebrand, General Accident, and National Provident in the United Kingdom, and Gerling in Germany formed an environmental alliance, drawing up a letter of intent linked to a United Nations Environmental Programme

(UNEP) statement. The UNEP program director at the time worked closely with the industry and cosponsored the "Statement of Environmental Commitment," in which the signatories promised to incorporate environmental considerations into their risk management and to adopt industry best practices in this regard (UNEP, 1996). They would regularly make public reports of their environmental actions, and would realign their asset management along with environmental considerations (Kirk, 1995). By November 1996, 62 insurers from around the world had signed on to this statement.

A year later, UNEP sponsored a conference on the Insurance Industry and the Environment in London at which close to 100 insurance companies from around the world participated. The conference focused on ways the industry could implement their commitment to incorporate environmental considerations into their "best practices." They focused on eight areas: the handling of claims for losses; managing insurers' assets; designing insurance products; preventing losses; managing physical assets; mobilizing the company; and environmental reporting and lobbying (UNEP, 1996). This eventually became one element in the overall strategy of the UNEP to organize the financial sector as a whole on environmental issues.[5] The UNEP Financial Initiative (UNEP FI) now was joined by an Insurance Industry Initiative, or UNEP III (see Table 2).

A UNEP III position paper on climate change from 1996 clearly pointed out the potential effects of climate change. It discussed not only the losses that might be suffered by property insurers, but also warned that life insurers and pension funds may also be affected by climatological effects on human health. Long-term investors such as the insurance industry might be affected by major changes in economic activity. The report argued that market forces alone would not make this shift efficiently or effectively, and concluded that the precautionary principle must be the basis for decision-making (UNEP, 1996). The insurers that were part of the UNEP III threw their support behind the Framework Convention on Climate Change, urged countries to achieve early and substantial reductions in carbon emissions, and argued for increased participation by non-governmental organizations, including business, in the negotiations.

In recent years, the European, and particularly the British, insurance companies have continued to support the need for insurers to take account of climate risks in their business. Recently, the Association of British Insurers (ABI) produced a report arguing that climate change could increase the financial costs of extreme weather around the world. "Even quite small increases in the intensity of major storms (hurricanes, typhoons, windstorms), as predicted by the latest climate change science, could increase damage costs by at least two-thirds by the end of the century. The most extreme storms could become even more destructive, making insurance markets more volatile, as the cost of capital required to cover such events increases" (Association of British Insurers, 2006). Swiss Re recently announced that it would partner with RNK Capital LLC to sell insurance for Kyoto-related risk in carbon credit transactions. It has established a specialist unit to address climate change mitigation and to take advantage of emerging market opportunities (*Canadian Underwriter Daily News*,

TABLE 2: UNEP Finance Initiative - Signatories by Region 2006

Africa	3%
Asia	12%
Europe	72%
Middle East	1%
North America	7%
Oceania	3%
South America	2%

Source: UNEP Finance Initiative, http://www.unepfi.org

2006). Swiss Re also has been lobbying governments to combat climate change; it participates in the Carbon Disclosure Project, and is a member of the International Emissions Trading Association and the UNEP Finance Initiative, including the Insurance Industry Initiative. As Chris Walker, managing director of the Greenhouse Gas Risk Solutions unit of Swiss Re said recently:

> It is the nature of our business to identify risks in the long term, and I see strong communication of those risks as an obligation for a reinsurer. If you start talking about an issue for a number of years it creates a groundswell of interest and awareness. If we can do this with climate change then it will be good for our clients and good for Swiss Re (The Climate Group, 2006).

In North America, U.S. industry remained outside this mobilization, despite the efforts of Greenpeace to enlist them in the cause. It would be some years before the Canadians began to take notice. Neither Canadian nor U.S. insurers signed the environmental pledge co-sponsored by UNEP at the time it was put forth, and to date, few have signed on to the UNEP Financial Initiative. U.S.-based insurers in particular view it as a European initiative; and, from the other side, the participants in the initiative have shown little interest in working with U.S. insurers. U.S. insurers suffered losses similar to those of the European reinsurers, but viewed the problem as simply one of catastrophes that reduced their financial reserves and undermined their financial health, and not some larger problem.[6] The link the U.S. insurers made is not between global warming and disasters, but between over-development in threatened areas and the costliness of disasters, requiring government intervention.

“The link the U.S. insurers made is not between global warming and disasters, but between over-development in threatened areas and the costliness of disasters, requiring government intervention...

Canadian insurers began to take notice of the potential effects of climate change earlier than their U.S. counterparts, but still lagged behind the Europeans. The Canadian property and casualty insurers funded the creation of an Institute for Catastrophic Loss Reduction (ICLR), which began calling for action on climate change in 2005 with a call to the prime minister to develop a strategy on climate change. (*Canadian Underwriter Daily News*, 2005). In Mexico, given the heavy foreign investment in that sector, we can expect industry positions on climate change to reflect the stance of their major shareholders.

Only a few U.S. insurers mentioned global climate change as a threat to their business until recently. American Re has invested some funds in technologies to reduce environmental risks. The company was purchased by Munich Re, a European leader in linking insurance losses and climate change, and this may have led it to become more active on environmental issues. Frank Nutter of the Reinsurance Association of America has been the primary liaison between the U.S. industry and Greenpeace, and initially expressed doubts about the climate change-insurance loss link (Sabar, 1994a). Many U.S. firms have yet to come out publicly on this issue. Only recently did AIG, a major insurance firm, acknowledge that climate change is a significant financial risk to the industry, and that action must be taken (Mills, Roth, et al., 2005). The U.S. industry response to severe weather patterns has been a traditional one, lobbying the United States government to establish a federal disaster fund as a safety net for the industry on the grounds that major catastrophes threaten the solvency of insurers, and their solvency is crucial to the economic health of the nation (Gordes, 1997). Canadian insurers have also called upon their government to take action, and have not taken significant steps to address climate change through insurance policies.

Neither U.S. nor European insurers have as yet chosen to change their premium prices based explicitly on climate risk assessments (*The Economist*, 2004). There is still a great deal of uncertainty regarding models of weather patterns, and how the distribution and impact of changes will affect insured property and lives. The string of hurricanes

in 2005 is now being incorporated into the most recent risk prediction models, however, and may lead to higher premiums in 2006 (*Consumer Reports*, 2006). Lloyd's, the London based insurance market, recently issued a report arguing that the industry has to re-evaluate its models for underwriting, investing, and pricing its products or it could face financial stresses and even collapse (*The Economist*, 2006). The European insurers have been more advanced in developing climate prediction models utilizing the latest climate science. They have also invested in developing new measures of carbon emissions in order to benchmark progress in this area and valuate firms (Jagers, Peterson, et al., 2004). In the United States, the insurance industry is doubtful that state regulators will allow them to raise their prices based on models of the future, as opposed to traditional pricing based on historical data. Predictive models are viewed by regulators with suspicion, and historical data is perceived to be impartial and fair in determining underwriting results. (Mills, Lecomte, et al., 2001). So far, Massachusetts is the only state that has allowed changes based on future estimate (insurance is regulated at the state level in the United States) (Mills, Roth, et al., 2005; *Environmental Science and Technology*, 2006).

The slow response in the U.S. insurance sector, however, has prodded other actors to respond. There has been a long-standing interest on the part of environmental advocacy groups in persuading the financial sector to use its leverage over other firms to provide incentives for them to adopt more sustainable practices. In addition to the UNEP Financial and Insurance Industry Initiatives mentioned above, there has been continuous work by groups such as the World Resources Institute and World Wildlife Fund to develop partnerships and dialogue with the financial sector. Recently, the Ceres coalition of investors and environmentalists sponsored a prominent report on climate change and insurance (Mills, Roth, et al., 2005). It also organized 20 institutional investors, with $800 billion in assets, to ask 30 publicly held insurance companies to create risk analyses of climate change and report these to the public by August 2006.[7] These investors include state treasurers from California, Connecticut, Kentucky, Maryland, New York, North Carolina, Oregon, and Vermont; two of the largest public pension funds; the New York City Comptroller, the Illinois State Board of Investment; and others. They are all members of the Investor Network on Climate Risk (INCR), a non-profit that is working to influence climate change policies (*The Economist* 2004; *Consumer Reports*, 2006; GreenBiz.com, 2006). This pressure from Ceres is credited with pushing AIG to take a publicly proactive stance on climate issues.[8]

WHY THE VARIATION IN RESPONSE?

Why the big difference in response between the European and U.S. insurers? Why the slow uptake in the United States (and Canada)? There are a number of possible reasons. First, U.S. insurance companies invest relatively little into research, either individually or as an industry. The largest U.S. insurance companies have not established research into climate change and its consequences, and there has been no systematic research by anyone, public, private, or academic, on the potential effects on the industry (Mills, Roth, et al., 2005). Many insurers say they are waiting for more certainty regarding the science of global warming.

This contrasts with the European industry, which regularly reports on environmental issues and the possible impact of climate change (Mills, Lecomte, et al., 2001). Swiss Re has been issuing reports on trends in natural disasters for decades. In Germany, Allianz Group established a "Climate Core Group" to study the issues, and is working with the government on how to respond (Mills, Lecomte, et al., 2001). European firms tend to have in-house scientific research capabilities that U.S. firms do not, providing a voice within the corporate organization for future-oriented planning (Gordes, 1997). However, a few reports from U.S. industry research centers in the last few years note the possibility that climate change could be a factor in insurance losses. Most U.S. insurers appeared to believe that the research on this topic is not conclusive enough to warrant active efforts to reduce carbon emissions; therefore, they simply recommended continued research instead of action (Gordes, 1997). A statement from Wallace Hanson, president of the Property Loss Research Bureau, reflects the common attitude:

> The industry mindset is: Is this part of the normal cycle? Or, as Greenpeace suggests, is it something that society is bringing on itself and will get worse? This is the fence companies are sitting on. I feel

> that fossil fuels may be the cause, but I'm afraid of throwing a whole lot of resources at it and finding out it's something completely different (Gordes, 1997, citing Sabar, 1994).

However, there is increasing evidence that scientific knowledge regarding climate change is beginning to be more widespread within the industry. In February 1995, the U.S. Insurance Institute for Property Loss Reduction, the Reinsurance Association of America, the Office of Vice President Gore, and Undersecretary of State for Global Affairs Timothy Wirth, sponsored a meeting on climate change attended by a number of U.S. insurers at which they agreed to review the link between environmental change and recent losses. Both climate scientists and European insurers made presentations (Gordes, 1997). In the mid-1990s, insurers and reinsurers in Bermuda, the United States, and Europe established the Atlantic Global Change Institute (AGCI) to conduct research on climate risks that affect business. It focuses on making available to insurers the latest scientific advances in predicting climate patterns, although to date it has had little influence (AGCI, 1996). Ten years later, in 2006, the U.S. National Association of Insurance Commissioners finally set up a task force to study climate change, a belated effort to consider the risks to insurers of climate change[9] (Hsu, 2006). The Canadian Institute for Catastrophic Loss Reduction, funded by insurers, has directly addressed climate change issues, and in the last year or so they have become more prominent in climate change debates (Canadian Underwriter Daily News, 2005).

Another reason for the conservative position of U.S. insurers may be the liability system in the United States. In the past few decades, insurers have been forced by the court system to pay for environmental cleanup beyond what they had contracted for originally. Long after the relationship between the insurance company and the customer has been ended, the insurer may still be held liable for pollution and environmental damage. This may encourage insurers to simply withdraw from markets, where possible, instead of dealing with liability in cases of property damage from climate change.[10] A similar legal environment does not exist in Europe or in Canada.

Unlike their European counterparts, U.S. insurers simply do not perceive the possibility of financial opportunities from climate change action. European insurers perceive good financial prospects for investing in emissions trading, renewable energy, climate friendly technologies, and new insurance products that help customers manage environmental risks. European insurers plan to become directly involved in carbon trading markets by providing incentives for industry to adopt more environmentally-friendly technologies through the terms of their insurance contracts (Allianz Group, 2006). Swiss Re, as mentioned above, is already planning to insure carbon transactions. It has established a specialist unit within the company called Greenhouse Gas Risk Solutions, to focus on mitigating and managing risk and pursuing opportunities; it seeks "first mover" advantages in creating an investment fund for energy efficiency and renewable energy in Europe (The Climate Group, 2006). In Europe, insurers are more sensitive about their reputations, which are more easily affected by public perceptions regarding their responsiveness on the environment (Dlugolecki, 2004).

The United States lacks such a green market, which would provide incentives to change. However, this does not mean that U.S. insurers are completely unaware of possibilities for profit—they just have been very slow to recognize it. AIG, based in the United States, recently announced it planned to get involved in mitigating and profiting from climate change. It plans to get in on Europe's carbon emissions trading scheme, which some predict will be a huge market. Marsh and McLennan, a major insurance broker, produced a report a year ago that told a range of clients across many industries that they would be left out in the cold if they did not respond to climate change now. It is positioning itself as a consultant on climate risk, including the threat of increasing lawsuits (Lavelle, 2006).

Another reason for the difference in response is due to the paradoxical role of the U.S. government. The U.S. government has a large role in insulating insurers from particular kinds of risk, with extensive government programs for both flood and crop insurance (Mills, Lecomte, et al., 2001). At the same time, the government has done almost nothing on climate change mitigation. Government action on one and inaction on the other directs insurance industry attention away from this issue. There is both an assumption by insurers that the U.S. government will pick up the slack if the private sector does not provide insurance and an awareness that any action by them on global warming issues probably would not elicit support from the government (Mills, Lecomte, et al., 2001). At the same time, the U.S. regulatory system

discourages the use of new predictive models, and the tax system provides disincentives for the industry to build up reserves for future disasters. There is also strict regulation of the insurance sector, and any attempts to raise prices or withdraw from the market generate regulatory scrutiny (Mills, Lecomte, et al., 2001).

CHOICE AND CONSEQUENCES

There are three main options for insurers in the face of these debates over climate change, its potential effects, and the definition of their own interests (Leggett, 1993). These three options are not mutually exclusive, and some firms are attempting to pursue more than one at once. Many insurers, particularly in North America, are simply doing nothing in the hope that the most-dire predictions are simply wrong and recent natural disasters are a fluke and not a trend. These firms, despite the pressure from reinsurers and from increasing dissemination of knowledge about the risks of climate change, define their interest in terms of immediate short-term calculations of profit and loss. They are reluctant to give up a market that still remains profitable for many. No one firm will withdraw from a particular market unless it is assured that all others will do so, too; otherwise, the lone firm still selling insurance under the terms and conditions that others no longer agree to use will reap monopoly profits. If natural disasters continue to increase in number and severity due to climate change, then the ultimate risk will be placed on governments, since the insurers will experience extreme losses, go bankrupt, or finally withdraw entirely from particular markets. U.S. and Canadian insurers are not alone in this attitude; in fact, some point to it as a particular problem in developing countries, where insurance markets are not yet well developed[11] (Cheung, 1995).

Many insurers are counting on government to provide the funding to recover from disasters, and to supplement the private market with public insurance funds. We have certainly seen this recently with the reaction to Hurricanes Katrina and Rita losses, and the millions of dollars being spent on recovery in the Gulf states. State governments in the United States are looking to the federal government to establish new disaster insurance funds today. In Mexico, the destruction caused by flooding and high winds either is either covered by the government or borne entirely by individuals and businesses. At a global level, we see the same dynamic at play; the Alliance of Small Island States, which will be the first to feel the effects of rising sea levels, has proposed that governments establish a global insurance institution to fund the costs of climate change in their countries. This

> Insurers also could create new financial products and services that help companies reduce their carbon emissions (e.g., through risk consulting and carbon credit finance); facilitate investment in renewable energy technologies (e.g., through carbon credit insurance and structured finance); and which provide incentives for companies to improve their governance and performance on climate change (e.g., directors' and officers' liability policies which provide additional protection to companies that have taken steps to reduce their emissions).

would be a public insurance project, and not the kind of private market activity this paper focused on.

A second option is to directly confront climate change and its effects, and assume that it is an unstoppable force. The goal would be to make sure there are sufficient financial resources for the insurance industry to remain solvent, and to prevent harm to other financial actors such as banks and institutional investors. Private markets would do what they do best: signal what adjustments others should make through the price and availability of insurance (Stone, 1992). Some argue that this would provide a smooth transition to a less fossil-fuel dependent world, but the pace of change may instead lead to extreme volatility in prices and availability, which is what we are seeing right now in the North American market.

Under this option, private insurers would need to consider climate risks more directly in determining where and what to insure and how much to charge. Many areas, particularly coastal ones in the United States and Mexico, would no longer be insured by them at all. Coinsurance, perhaps through insurance pools, would become more common. Other financial sectors could take up some of the risk, for instance through developing new products such as "catastrophe futures" and weather derivatives to hedge against very high risks and losses. Thus, risk would be transferred from those experiencing losses, to the capital markets, instead of to insurers (Jagers, Peterson, et al., 2004). But it is through the terms of insurance contracts and the types of insurance they sell that insurers have a degree of leverage over industry. For example, North American insurers could consider imposing higher premiums on companies that do not have environmental management systems, which is an option being considered by European insurers. Ceres has a project that is exploring whether shareholder lawsuits can be brought against corporate directors who can be accused of putting their companies' assets at risk by not addressing climate change. This liability could be used to influence investment decisions. The insurers that supply directors' and officers' liability insurance could be hit hard by this, and may require their customers to implement new environmental policies to reduce the risk.

Insurers also could create new financial products and services that help companies reduce their carbon emissions (e.g., through risk consulting and carbon credit finance); facilitate investment in renewable energy technologies (e.g., through carbon credit insurance and structured finance); and which provide incentives for companies to improve their governance and performance on climate change (e.g., directors' and officers' liability policies which provide additional protection to companies that have taken steps to reduce their emissions). This would be a more "optimistic" strategy, at least for insurers, in that it would entail developing new market opportunities. Insurers would do what they do best package risks and sell financial coverage for losses. They would look upon climate change as a profitable opportunity, and not just as a source of disastrous losses.

A third option would be to actively work to prevent climate change from occurring, instead of simply redistributing the losses. Political activism through such fora as the UNEP III represents this strategy, and the work of the Ceres coalition is another face of this. This strategy relies on the government not as a source of deep pockets to pay for losses in a disaster, but as a regulatory institution to force change on industry as a whole. The originators of the insurance-environmental alliance had already established expertise and had begun developing both the normative and technical requirements of a proactive stance. Uni Storebrand has expertise in marine insurance, General Accident in climate change, National Provident in ethical investments, and Gerling has a separate institute for environmental research (Kirk 1995). As a result of their expertise and activism, they helped establish a new international effort to develop new norms regarding the role of insurers in climate change debates. In Canada, insurers have explicitly called upon the government to provide a larger framework of sustainability for addressing climate change risk. Right now, however, the current government has turned its back on Canadian commitments under Kyoto, which makes it unlikely the insurers' demands will be heeded.

It is clear that the insurance industry is beginning to change, but it is also evident that they are not as yet making any profound changes in how they do business. There are a few companies pursuing progressive strategies that attach environmental conditionality to the products they sell. But this is a very competitive market, and this strategy only works well where there is government support and a "green" market. There is increasing discussion among insurers about the need to prevent climate change and engage in political action. But as yet there is relatively little actually being accomplished. Nevertheless, there are a number of reasons to think that insurers will make more significant changes in the coming years. The extreme weather of the last few years, combined with the increase

in oil prices in the last few months, may have opened a window of opportunity. Governments, especially in Europe, are beginning to adopt policies that facilitate strategies premised on reducing greenhouse gas emissions. The emissions trading scheme will be the most significant of these policies. In addition, there has been increased activism directed at, and coming from, the financial sector as a whole. This includes the projects of Ceres, the larger Carbon Disclosure Project, and such financial sector initiatives as the Equator Principles, which regulate project finance on social and environmental values.

When the insurance sector as a whole becomes more completely committed to mitigating and profiting from climate change risk, they will inevitably have a profound influence on the shape of the economy. Individuals and firms will face potentially higher costs for doing nothing about climate change. This will provide a powerful incentive to change behavior. While it may take significant political action to make a real difference in reducing greenhouse gas emissions, the power of the market and the private actors that trade in it may have an equally significant impact.

NOTES

1. This report benefited from the valuable research assistance of Anthony Marcum, University of Maryland.

2. Governments and societies decide differently on how to handle the three main elements of a strategy to manage the risks of natural disasters: how to identify and prioritize risks, how to reduce them, and how to transfer risks or finance them. Insurance is primarily a means of transferring risks through financial means, protecting the income and savings of individuals and companies.

3. Gordes gives the example of Hurricane Andrew's impact on insurers in Florida to illustrate the severity of the losses: this category 5 hurricane, which did not even make landfall in the most developed areas of the state, nevertheless caused $16 billion of insured losses and wiped out the premiums collected over the previous twenty years in a matter of hours (Gordes, 1997).

4. For a comparison of the insurance sector to the energy sector on climate issues, see (Jagers, Peterson et al., 2004).

5. UNEP work with the insurance industry is part of its larger Financial Initiative, in which the organization gains commitments from banks, investment houses, and the wider financial community.

6. The legal and political system in the United States is such that insurers often pay more for catastrophes than in other jurisdictions. As one British insurance lawyer put it, "Experience shows that if a catastrophe happens in the U.S., you can expect to pay up to 30 times more damage claims than you would elsewhere in the world" (Souter 1991).

7. This Ceres initiative, along with a well-publicized report on insurance, has been funded in part by the Clinton Global Initiative.

8. Only four of the largest 27 property and casualty insurers report climate change liabilities to the SEC. The five insurers reporting on climate change risks in their 2004 annual SEC filings were Allianz, Aspen Insurance, Chubb, Cincinnati Financial Corporation, and Millea (Mills, Roth, et al., 2005)

9. The task force was set up in part because Midwestern politicians of both parties experienced unusual droughts and severe weather that raised questions in their minds about the cause. One remarked, "I'm a financial guy, not an activist... I don't know if we're prepared to be another Netherlands. But it does seem that we are too often in the position of cleaning up after the elephants run by" (Jackson, 2006).

10. For an interesting discussion of environmental pollution and insurance, see Mark J. Spalding, "Is a Threat to Lloyd's also a Threat to the Environment?" (1993).

11. While the market for insurance is global, in fact, most of it is sold in Europe, the United States, and Japan. Developing-country markets are being served to some degree by the international insurers based in New York, London, and Zurich, and this may be an area of future growth. One current research project based at the School of Management at the University of Bath is investigating how to improve environmental performance in developing countries through environmental conditions attached to credit and insurance.

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Campus Climate Action

DOVEV LEVINE

The "policy gap" created by U.S. federal inaction on climate change is being increasingly filled by local governments, businesses, and non-governmental organizations (NGOs). Such initiatives could learn and gain much from climate action on U.S. campuses. Campus climate action is important to overall climate change mitigation efforts for several reasons, including the following: 1) universities are often the size of small cities, so their emissions are significant; 2) many universities have made significant progress in reducing their own emissions; 3) university action can influence state and local climate policy; 4) universities play a major role in educating future leaders; and 5) universities offer ways to streamline efforts linking scattered climate action efforts. Interestingly, campus climate action in the United States appears to be much more active than that found in other countries, including European countries with stronger national climate policies than the United States.

Innovative and ambitious policymaking efforts in the United States on climate change and greenhouse gas mitigation are developing apace at regional, state, and local levels. These efforts include regional collaborations such as the 2001 Climate Change Action Plan of the Conference of New England Governors and Eastern Canadian Premiers, and the multi-state Regional Greenhouse Gas Initiative (RGGI) (Selin and VanDeveer, this volume). At the state level, currently more than half of the U.S. states can be characterized as actively involved in climate change, each with one or more policies that promise to significantly reduce their level of greenhouse gas emissions (Rabe, this volume). At the local level, evidence that many citizens and public officials want more stringent climate change goals and policies can be found in the 60 towns and cities in the Northeast United States, in addition to others nationally and internationally, that have joined the International Council for Local Environmental Initiatives (ICLEI) and its Cities for Climate Protection Campaign (CCP) (Selin and VanDeveer, this volume).

Yet state and local initiatives face challenges in their continued or expanded involvement on climate policy. At the regional and state level, a consortium of well-funded organizations hostile to any action by any government in the United States to reduce greenhouse gases has become increasingly vocal and visible. Such organizations include the Heartland Institute and the American Legislative Exchange Council (ALEC). It also appears increasingly likely that various interest groups and the executive branch of the federal government may join forces in bringing legal challenge against many state climate policy initiatives on constitutional grounds (Rabe, this volume). Municipalities are also challenged in their efforts to reduce greenhouse gas emissions. For example, the city of Cambridge, Massachusetts aimed to reduce emissions to 20 percent below 1990 levels by 2010. Yet, by 2004, emissions had risen

27 percent from 1990 levels, due largely to commercial and industrial emissions rising by 70 percent over this period (Selin and VanDeveer, this volume).

Given these challenges, campus climate action in the United States may serve as a model and ally for these local initiatives to achieve their emissions reduction goals. The full extent of U.S. campus climate action is unclear, leaving many questions unanswered about its effect on climate policy. Furthermore, while many universities have begun substantial activities to mitigate climate change and address this issue in their teaching, research, operations, and engagement with other institutions, a majority have not. Understanding what is happening on campuses nationwide would benefit overall mitigation efforts by demonstrating progress made in this important local sector. This paper focuses on policy leaders among universities, detailing contemporary university climate action, its relevance to the larger climate arena, the reasons for campus participation in climate activities, and briefly discusses the future of campus action.

CAMPUS CLIMATE ACTION MATTERS

Universities are uniquely placed to affect America's energy future. The higher education sector is a $317 billion industry that educates and employs millions of people, maintains thousands of buildings, and owns millions of acres of land. Because of their size, universities and colleges are often among the largest energy users and waste producers in their region. If every one of the 4,000 campuses in the United States used 100 percent clean energy, demand for renewable electricity in the United States would increase four-fold (Energy Action and Apollo Alliance, 2005). With institutions such as Harvard University producing 320,000 metric tons of carbon dioxide in 2005 (Economist, 2006), municipalities such as Cambridge could benefit from increased collaboration on climate action with their local universities. U.S. universities educate approximately 14.5 million students each year, meaning these institutions have a grand opportunity to teach the principles and urgency of climate change to many future leaders and voters (Barlett and Chase, 2004). Furthermore, the footprint of higher education is widening, with enrollment expected to increase by 23 percent between 2000 and 2013 (Energy Action and Apollo Alliance, 2005). Communication of climate change information, already underway at many universities, can play an essential role in not only educating our citizenry, but also mobilizing and sustaining citizen and civic action in response to climate change (Moser, this volume).

The City of Cambridge and other municipalities have found it difficult to achieve their reduction goals. In this regard, campus climate action could help. Universities function as their own communities, as they are often the size of towns or small cities. As the largest employer as well as the largest energy user and waste producer in their region, their emissions are significant (Economist, 2006). Thus, university efforts to mitigate climate change are often analogous to those at the local community level, and successful university climate actions can serve as models for the greater community. Campus climate action is also important as a model for other sectors interested in climate activities. To date, many regional and business efforts have focused on "smart growth" and "no-regrets" measures which seek to reduce both financial costs and greenhouse gas emissions (Selin and VanDeveer, this volume). Campuses have been setting an example for their communities and the nation by implementing alternative energy, efficiency, and environmental sustainability projects on campus to demonstrate their feasibility and cost-effectiveness (Energy Action and Apollo Alliance, 2005). These examples can be adopted by other sectors interested in "win-win" scenarios.

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The success of campus climate actions on a variety of levels such as reduced emissions, increased air quality, or financial savings is also important in promoting a positive vision of the future resulting from such initiatives. The

publication "The Death of Environmentalism" notes that a landmark social trigger, like Martin Luther King's "I Have a Dream" speech, would not have been nearly as effective if titled "I Have a Nightmare." Defining positive visions is necessary in order to effectively engage publics (Moser and Dilling, 2004).

Universities serve as centers for the dissemination of knowledge, modeling effective policies, and inter-organizational collaboration. Numerous inter-university collaborations already exist. These consortiums and alliances work on many university-specific issues such as multi-institutional agreements on diversity initiatives; they feature conferences and other opportunities for interpersonal discussion, which offer fora for shared information and potential partnerships on climate action. The effect of such interfacing on climate policy has already been demonstrated in the business sector. In many instances, participation in industry associations and institutional gatherings specific to climate change provides arenas within which expectations and understandings tend to converge. As a result, U.S.-based companies have moved toward accepting the need for some precautionary action (Levy, 2004). It is conceivable that universities could generate further interfacing through their own consortiums and networks.

In short, few institutions in modern society are better equipped to catalyze the necessary transition to a sustainable world than universities. They have access to the leaders of tomorrow, they have buying and investment power today, and they are widely respected. What they do matters to the wider public (Orr, 2004). Lessons learned from universities could provide a significant contribution to efforts to address the global warming problem (Decarolis, et al., 2000).

WHAT'S IN IT FOR UNIVERSITIES?

Universities engage in climate action for a host of reasons, including financial and marketing interests. Many expect to achieve significant financial savings through initiatives such as energy efficiency programs, wind farms, and cogeneration power facilities. For example, at the University of New Hampshire (UNH), a new cogeneration plant is projected to save the university anywhere from $30 to $50 million over the next 20 years (Maistrosky, 2005). Such investments also provide some measure of protection against volatile energy prices and occasional problems with the North American energy infrastructure. UNH, by producing much of its own heating and electricity needs, is likely better prepared to deal with an energy blackout similar to the August 2003 blackout in the Northeast. Matthew Simmons, a former advisor on Vice President Cheney's Energy Task Force, believes the 2003 blackout was a "fire drill for what the future could be" (Greene, 2004). Furthermore, by operationalizing climate change actions into their overall policies and values, universities can benefit from branding themselves as "sustainable." This branding effort can lead to public relations opportunities that may increase media attention, the quality and quantity of student enrollment, and alumni support.

Climate actions are also viewed by universities as teaching tools. The University of Massachusetts' Renewable Energy Research Laboratory (RERL), for example, exists to promote education and research in renewable energy technologies.[1]. RERL's work on wind turbines has encouraged many engineers to go into careers in renewable energy; many of the engineers had come to the lab after working for the oil and gas industry. Program alumni populate the renewable energy field, working in government (National Wind Technology Center), manufacturing (the wind division of GE Energy), and consulting (Global Energy Concepts) among many other sectors (Skolfield, 2006).

Furthermore, by producing future policy entrepreneurs, universities may enjoy a closer relationship with state politicians, potentially leading to increased state funding and access to policymaking. The Energy and Resources Group, a multidisciplinary graduate program at the University of California at Berkeley, has produced many alumni well-suited for employment in state and national programs dealing with climate change. A number of these graduates, for example, have gone on to staff the California Energy Commission Office. States' investments in their universities' climate efforts can reap the benefits of well-educated state policy entrepreneurs, who then further develop, enhance, and influence state climate policy. Such influence may be important to increasing state climate activities (Rabe, forthcoming).

Universities and their students may also benefit from climate action on a deeper level. By providing tangible

examples of climate mitigation activities, such as CO_2 reduction policies and cogeneration plants, universities "could channel energy of the human kind." Student engagement is valued and sought after by university leaders. According to one representative from the University of Massachusetts, "Once we harness students' enthusiasm, we could get some exciting things done here." (Cambo, 2006)

WHAT'S HAPPENING ON CAMPUS?

Examples of campus climate initiatives are organized here within the so called "CORE" (Curriculum, Operations, Research, and Engagement) framework.[2] Each of the CORE framework's four components is briefly discussed below, while Table 1 contains short descriptions of exemplary programs across North America.

Curriculum: What Is Taught

Institutions of higher education teach professional and intellectual skills. In doing so, universities can both teach and demonstrate environmental and stewardship principles by taking action to understand and reduce the environmental impacts that result from their own activities (Creighton, 2001).

Many universities are seeking to incorporate ecological literacy, energy conservation and efficiency, and sustainability into course curricula. For example, Oberlin College has developed courses based on sustainable design principles, enabling students to interact with climate issues on more personal levels. These principles can, in theory, be carried into the decisions and values of their post-university lives and careers, all of which serves to demonstrate the complex and abstract nature of the effects of climate change. Given that the impacts of climate change are more often visible in areas far from the emissions release point, such principles illustrate their effects to these students,

Sustainability initiatives are also being incorporated into the curriculum at leading business schools in order to make future business leaders more aware and responsible: "The people in business today who are trying to grapple with these issues have business degrees that didn't equip them to understand what's really going on," argues Rick Bunch, executive director of the Bainbridge Graduate Institute, a school on Bainbridge Island in Washington that offers an MBA and a certificate in sustainable business[3] (Di Meglio).

Universities also educate students through informal means. At Swarthmore College, a wall of gauges tells students how much energy that a particular building is consuming (Biemiller). Since students learn from everything around them, such informal education is highly important in aiding their understanding of anthropogenic contributions to climate change (Newman). Similar education is occurring at Berea College in Kentucky, where housing complexes incorporate many of the principles of environmentally sustainable construction and operation. Residents noted a subsequent increased awareness of wasted resources and energy usage (Scully).

Operations: How the University Is Run

Many universities are increasingly engaging in more sustainable operations for financial reasons, with comprehensive projects offering a payback in three to five years. Furthermore, smaller-scale efforts such as improving the efficiency of lighting, labs, and vehicles can have payback periods of as little as three months (Creighton, 2001). Such efforts serve as important models for other sectors interested in climate change activities, as they demonstrate "win-win" and no-regrets measures currently favored within regional, state, and local sectors.

More than 200 colleges purchase electricity or heat from renewable-energy sources, such as commercial wind farms, or have installed their own on-site

"Many universities are increasingly engaging in more sustainable operations for financial reasons, with comprehensive projects offering a payback in three to five years.

TABLE 1: Campus Climate Action Examples

Curriculum	A project setting standards for sustainability was recently unveiled at **Oberlin College**. The 260 students who were involved in research at the Adam Joseph Lewis Center for Environmental Studies have graduated with an understanding of what it takes to create a sustainable building: one that generates more electricity than it uses, discharges no contaminated water, uses no toxic materials, and is surrounded by landscape that promotes biological diversity. Says David Orr, the Oberlin professor whose class of 25 students first set the high standards, "Education that builds on solving real problems requires... [overcoming] the outmoded idea that learning occurs exclusively in classrooms, laboratories, and libraries." The **Energy and Resources Group (ERG) at the University of California at Berkeley,** an interdisciplinary graduate program, centers on shared learning rather than a particular approach to environmental synthesis, which has kept ERG among the leaders of innovative, interdisciplinary thinking. Their approach proved successful for a number of reasons. After two years of interacting with faculty and students in the program, those master's degree alumni with prior training in engineering were able to pose questions in economic terminology that numb conventionally trained neoclassical economists at the public utilities commission, opening up possibilities for energy efficiency to be treated on a par with energy supply in the regulatory process. Likewise, graduates with prior training in economics were able to ask sophisticated environmental and engineering questions. The benefits of this approach were demonstrated when California established an Energy Commission to seek alternative futures and ERG graduates assumed key positions early. The Public Utilities Commission responded with new policy initiatives and procedures to promote energy efficiency and renewable-energy technologies, and ERG alumni were the ideal job applicants to shoulder these new efforts. In short, this is a prime example of a university and its home state acting in concert to improve the environment.
Operations	The **University of New Hampshire**'s cogeneration plant will allow UNH to generate 75 percent of its own electrical and thermal power, with the possibility of someday being able to handle 100 percent of the load. This will result in a 45 percent reduction in emissions, the equivalent of eliminating 13,000 automobile round trips in and out of campus per day. The cogenerator will directly contribute to the reduction of many air pollutants, including a 20 percent reduction in the sulfur content of acid rain. Because of the plant, UNH is projecting it will save $30-$50 million dollars over the next 20 years. **The University of Massachusetts-Amherst** is building a new cogeneration facility that will be one of the environmentally cleanest central-heating-plant projects in the United States. By March 2008, the plant will satisfy all of the campus's heating and cooling needs as well as a large part of its electricity demands. The new plant will be powered by oil and natural gas; coal, currently supplying half the heat on campus, will no longer be used. With this switch, the university will cut campus carbon dioxide emissions to one-seventh of 2006 levels, according to John Mathews, assistant director of campus projects for facilities and campus planning. UMass hopes to use this plant to publicize the center as well as the campus. According to Larry Ambs, director of the Northeast Combined Heat and Power Application Center at UMass Amherst, "We plan to use it to teach our own students. Cogeneration is the last big frontier for conservation, and this plant puts us on the cutting edge of the technology."
Research	The Decision Center for a Desert City at **Arizona State University** seeks to engage scientists and decision makers in studying new methods to better understand how to make decisions that reduce the region's vulnerability to climate uncertainty. New testing methods developed by **Oregon State University** researchers will allow the food industry to determine whether food is truly local. By analyzing several variables and comparing the results to a database, the researchers can pinpoint within a matter of miles where the food comes from. Knowing the origin of food commodities is important, according to an OSU professor, because of differences in regions' associated value, handling procedures, threats from bioterrorism, and the complexities of international and state-to-state trade. **Portland State University** is developing core multidisciplinary research competencies in key areas related to sustainability, including: intelligent transportation systems; integrated water resource management; sustainable urban design; sustainable business processes and practices; and environmental science and green technology development.
Engagement	**Clean Air-Cool Planet's** on-line Campus Climate Action Toolkit (CCAT) aims to make resources available to anyone interested in making their institution more "climate friendly." The CCAT is intended to: 1) model what an actual campus climate action plan might look like; and 2) help people understand, plan, and implement the CCAP's various elements. **The Campus Climate Challenge** is a coalition of 30 leading environmental and social justice organizations that aims to organize college campuses and high schools across the United States and Canada to achieve 100% clean energy policies at their schools. The Challenge hopes to achieve this by coordinating efforts and sharing ideas, in hopes that this can produce aggregate outcomes greater than what any of the participating organizations could achieve independently. Drafted in 1990 at an international conference in Talloires, France, the **Talloires Declaration** is the first official statement made by university administrators of a commitment to environmental sustainability in higher education. It is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations, and outreach at colleges and universities. More than 300 university presidents and chancellors in more than 40 countries have signed the document.

cogeneration plants that allow them to recover heat as a byproduct of other power generation (Blumenstyk). For example, the UNH cogeneration plant, which provides 50 percent of the university's power needs, has reduced greenhouse gas emissions by 40 percent (Kelly, 2006). The plant is projected to pay for itself in as little as four years, at which time operating costs will be significantly less than purchasing energy from the local utility grid. As a result of this investment, UNH will reap financial and environmental benefits as well as positive media attention from local and regional news outlets.

Campus operations also help to make renewable energy sources such as wind power more affordable. Students at the University of Oregon in Eugene voted heavily in favor of paying up to $2 per year per student for sustainability projects such as wind power. The money produced by the fee gives more financial support for wind power in general, and leads to a greater likelihood that wind power will become affordable and more widely used (Sylwester).

Research: What's Studied in Depth

Universities are among the leading institutions for climate research and have responded to the complex and interrelated nature of climate change by establishing interdisciplinary research institutes. The work of these research centers is crucial to the continued understanding and problem-solving of climate change. Research institutes play a key role in forming scientific knowledge about climate change. UNH's multidisciplinary Climate Change Research Center, for example, is dedicated to the retrieval and interpretation of global change records that document climate change.[4]

Policy is also a major focus of many climate research institutes. The Decision Center for a Desert City at Arizona State University engages scientists and decision makers in studying new methods to better understand how to reduce the region's vulnerability to climate uncertainty. Similarly, at Carnegie Mellon University's Climate Decision Making Center, researchers focus on current limits of making accurate predictions of climate change and its impacts, including the costs and the implications of climate change policy decisions (*UPI Space Daily*).

University-based research institutes also play a key role in forming energy solutions: Stanford University's Global Climate and Energy Project conducts fundamental research on technologies that will permit the development of global energy systems with significantly lower greenhouse gas emissions (*UPI Space Daily*).

Engagement: How the University Interacts with Others

Engagement is the level of work and cooperation the university fosters with external institutions and communities. For example, an industry-university collaboration between Duke Energy and Duke University, funded by a $2.5 million pledge from Duke Energy, focuses on assessing the environmental and economic costs and benefits of federal policy options for addressing emissions of carbon dioxide and other greenhouse gases (PR Newswire). Another example of engagement is The Campus Climate Challenge, a project of 30 leading environmental and social-justice organizations throughout the United States and Canada. It coordinates efforts and shares ideas among its members in order to produce aggregate outcomes greater than what any of the participating organizations could achieve independently. This initiative leverages the unique attributes of the partner organizations to empower youth organizers and bring highly-specialized experience to the entire campus climate movement.

Engagement at this level can yield increased funding for university research and opportunities for increased visibility. This engagement, in turn, may result in positive attention from lawmakers (who determine public school budgets) and other state officials. Furthermore, information-sharing gives a boost to each institution through the sharing of shared ideas and resources, the linking of allies, and bringing like-minded people together for conferences and workshops (Barlett and Chase, 2004).

TAKING STOCK OF CAMPUS CLIMATE ACTION

One should not overstate climate action on North American campuses; relatively few have taken serious, concrete steps to move toward a cleaner energy future. Of the approximately 4,000 colleges and universities in the United States, research indicates that only 80 to 200 purchase clean energy, and most of these have implemented but small-scale clean-energy projects. Furthermore, only a handful of campuses have

> Campus climate action can have an important impact on sustainable development efforts both at home and abroad.

developed comprehensive plans with targets and timetables for substantially reducing greenhouse gas emissions and achieving energy independence (Energy Action and Apollo Alliance, 2005).

Also, there is a lack of comprehensive analysis of campus climate action. While numerous campus climate activities do exist, there is no single standard available for measuring these activities or their overall impact upon the larger climate arena. It is difficult to obtain consistent data, such as the number of universities purchasing clean energy or the number engaged in "greening" their curriculum. The Talloires Declaration and the Campus Climate Action are two of the leading consortiums encompassing multiple institutions of higher education under a single agreement (see Table 1), yet only 182 U.S. universities—not even five percent—have signed onto Talloires. More systematic information about what entices university leaders to sign onto such pledges and programs and about impediments to doing so would increase our understanding of campus climate action.

Many institutions have the "will" but not necessarily the "way" to become leaders in climate change action. University climate change goals need more support. Capital-intensive initiatives such as large wind turbines can cost several million dollars; while these large-scale projects can save money in the long run, start-up costs may prove prohibitive to many otherwise interested institutions. It is also important to gain a better understanding of the political constraints such "willing" universities may be facing. For example, the University of Massachusetts attempted to construct a cogeneration plant more than 20 years ago, but the project was delayed because the local power utility, which did not want to lose the university as a customer, used its influence in the state legislature to oppose the plant (Skolfield, 2006). Such scenarios play out across the country, impeding climate change actions.

Campus climate action can have an important impact on sustainable development efforts both at home and abroad. Many large-scale initiatives such as the UN Millennium Project call for increased attention to be paid to local action. As mentioned earlier, universities are similar to local communities in many ways, and are demonstrating strong climate leadership and modeling; many lessons can be learned from campus climate action and applied to other sectors, including local government and business.

Although opponents of climate change action attempt to undermine policy efforts, many universities are playing a major role in helping their students understand the principles of climate change, as well as individual actions each may take. Encouraging individual efforts is important in the current political environment in which many students (and others as well) feel disenfranchised, and communicators face the tremendous challenge of demonstrating that those who should be tackling the problem are not doing so sufficiently (Moser, this volume).

Campus actions also lead to benefits in areas not limited strictly to climate change issues, such as improved air quality. This is important, since climate change action can benefit from links to other social issues, including those of an economic and security nature (Moser, this volume). Many climate change activities are directly related to efforts to use more renewable energy—and less energy overall. If linking issues at the university level can be achieved, other sectors and actors can adopt lessons learned and increase visibility and relevance on climate change in the larger society.

NOTES

1. For more information on the RERL, see: http://www.ceere.org/rerl/index.html

2. This organizing framework is used at the University of New Hampshire to incorporate sustainability principles into all facets of campus activity.

3. For more information on the Bainbridge Graduate Institute, see: http://www.bgiedu.org/.

4. For more information on the UNH Climate Change Research Center, see: http://www. ccrc.sr.unh.edu/.

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Communicating Climate Change–Motivating Civic Action: An Opportunity for Democratic Renewal?[1]

SUSANNE C. MOSER

This [sustainability] consciousness will not be attained simply because the arguments for change are good or because the alternatives are unpleasant. Nor will exhortation suffice. The central lesson of realistic policy-making is that most individuals and organizations change when it is in their interest to change, either because they derive some benefit from changing or because they incur sanctions when they do not…

William D. Ruckelshaus (1989)

Nearly twenty years ago, when climate change had just begun emerging on the public and policy agendas, two-time U.S. Environmental Protection Agency Administrator William Ruckelshaus commented on the need for governments to help lead in the transition to a more sustainable interaction of humans with their environment. He argued that while governments are critical in setting priorities and policies, and in modeling the new behavior, civil society is absolutely indispensable in bringing about this profound change. He also recognized—as the above quote suggests—the challenges of communicating and engaging civil society in this task.

Two decades later, many argue that the federal governments of North America are falling short of the needed leadership on climate change (VanDeveer and Selin, this volume). In fact, if one presumes the role of a democratically-elected government to be governance in the common interest, then it could be argued that the United States in particular is failing its citizenry. In the absence of committed top-level leadership in the United States, bottom-up pressure is building to force policy changes at the federal level. Several papers in this collection provide convincing evidence for growing action on climate change at various levels and in various sectors of U.S. society (VanDeveer and Selin; Rabe; Levy; and Levine; all in this volume) and one could argue that a social movement for climate protection is slowly emerging in the United States (Moser, 2007). Society in that sense is beginning to take

> U.S. society … is beginning to take up a truly civic responsibility in a democratic society where elected leaders do not represent the emerging majority will of the people: to push government to act in the common interest.

up a truly civic responsibility in a democratic society where elected leaders do not represent the emerging majority will of the people: to push the government to act in the common interest and model alternative behavior. But social movements begin small and U.S. (and Canadian) society is not yet fully on board regarding the need for comprehensive action.[2]

This paper focuses on how civic engagement on climate change can be fostered further, and uses the U.S. situation as a testing ground. Clearly, civil society alone will not be able to address the challenges posed by climate change. But civil society has two critical roles to play in climate policy and action: it can (1) mobilize for policy changes at higher levels of government, and (2) enact behavioral changes consistent with needed mitigation (and adaptation). This paper also rests on an argument made more fully elsewhere (Moser and Dilling, 2004) that those who could encourage such engagement have not communicated climate change effectively enough to generate widespread mobilization.

In the next section I lay out why effective communication is essential to bringing about these two types of civic engagement. The third section focuses on specific communication strategies that can increase civic engagement and illustrates these with best practices and examples from the North American context. It also discusses how these strategies can help overcome some of the barriers people experience that may prevent them from engaging the issue of climate change. I close with some thoughts on how the immense challenge of climate change—through the communication and civic engagement it demands—may serve a much-needed democratic renewal in U.S. society.

COMMUNICATION AND CIVIC ACTION

Linguistic Roots, Practical Linkages

Communication can play an essential role in mobilizing and sustaining civic action. As such, communication expresses and supports the fundamental work of civic engagement in a democracy. A first approach to this deep linkage is through language: communication and community share the same linguistic root. Etymologically, the word "to communicate" derives from a Latin word that means "to impart," "to share," and "to make common;" in turn, the word "common" derives from the two roots *com-* "together" and *munia* "public duties" (Harper, 2001). This etymology links communication closely to the ideal of civic action. Practically, communication and community can also mutually foster each other, whereas unsuccessful communication can alienate individuals from acting in the public sphere and hence completely fail to be an instrument of citizenship. Thus, communication needs to be designed and executed effectively, if it is to be a useful tool in building and sustaining the community that acts on a *res publica* (a matter of public interest) such as climate change, and in helping individuals create, and feel part of, a civic community.

For the purposes of this paper, it is useful to borrow from the "civic renewal movement" literature the distinction of "being a citizen," i.e., in a narrow sense merely being an individual member of a city, country, or otherwise defined community, from "participating in civic action." The former may be quite divorced from public and political life and relegated to being a self-interested individual acting on his or her own needs and wants, consuming goods and services, and otherwise ensuring that these personal desires are met (through complaints, advocacy, volunteering, or the singular political act of voting). In that capacity, of course, people can help reduce their energy use and reduce their use of technology that produces greenhouse gas emissions. The role of communication in this case would be to foster individual behavior change. Someone engaging in civic action, by contrast, is an individual whose actions are committed to, done with awareness of, and in support of, a larger social, common, public goal. Differently put, civic action is public action by members of a community in response to a public matter of great concern. Or as Boyte and Kari (1996) put it, civic action is "public work"—work done *in* public, *by* the public, *of* the public, and *for* the public. "'Public work' is work by ordinary people that builds and sustains our basic public goods and resources—what used to be called 'our commonwealth'" (Boyte and Kari, 1996).

Communication plays a critical role in such "public work." How we speak about the issue that concerns us, how we talk with one another, and how we articulate the solutions to the problem make all the difference. Communication is the most basic means by which we

express the focus of civic action. It helps create a lens through which we view the matter of concern as well as understand its deeper causes, implications, and solutions. It develops and feeds on social capital (e.g., Daniel, Schwier, and McCalla, 2003). As a means to create common cause and understanding, it makes connections across issues and thus helps build a public that is engaged on climate change.

Common Obstacles to Civic Engagement on Climate Change

For communication to achieve all these objectives is no small order. It is difficult enough to communicate the unwieldy problem of global climate change to various lay publics; it is extraordinarily difficult to overcome the lethargy, habits of thought and action, and institutional arrangements that underlie our current energy-consuming, emissions-generating behaviors. For individuals to become civically engaged political actors adds the challenge of overcoming widespread disenfranchisement from the political process, so commonly observed in contemporary U.S. society. In short, there are internal (psychological and cognitive) processes that may prevent an individual from engaging on this issue, as well as social, political, and external structural barriers to such engagement (see Table 1 for a brief discussion of common barriers to civic engagement on climate change).

This list of barriers to civic engagement discussed in Table 1 is certainly not complete, but highlights some that are critical to consider when designing communication campaigns that aim at mobilizing individuals to participate in civic action. Understanding these barriers more fully can give communication efforts a clearer focus and infuse them with a longer "shelf life" than the average 10-second sound bite or 10-month outreach campaign. The role communication can play and the strategies one may employ build on the recognition of these reasons for inaction.

COMMUNICATION STRATEGIES TO MOBILIZE CIVIC ACTION ON CLIMATE CHANGE

Civic engagement depends critically on effective communication. Communicators frame the issue of concern; mobilize social or political actors *and* their opposition; and promote the solutions. They can sustain civic engagement through challenging times, help cross social divides, and assist in the deeper societal transformation ultimately needed to address this immense challenge.[3]

For communication to play these roles effectively, i.e., to contribute to a desired social change such as engaging people in sustained civic action on climate change, communicators have to meet two interrelated challenges: (1) elevate the motivation to get involved, and (2) lower the barriers/resistance to that engagement or that change in behavior. Mainstream communication efforts in the past, dominated as they were by physical scientists, environmental advocates, educators, and the media, typically emphasized the motivational side of this equation by giving people more information, scaring them, or appealing to their economic self-interest or moral self. Social scientists studying the impacts of these communication efforts, in turn, have focused on people's attitudes, understanding, level of concern, and (abstract) support for government policy. Scientific insights on what people actually do, how their action or inaction relates to their sense of civic responsibility, or how people overcome the barriers they face, is still rather scant to date. Below, I highlight promising elements of communication strategies for climate change and illustrate them with current examples from the U.S. context.

Audience Choice

Best practice in communication begins with consciously and strategically selecting an audience and understanding that audience's mental models and level of understanding of climate change, its interests, values, and concerns. This deeper understanding helps communicators make connections to issues already of concern to a given audience and frame climate change in a language that resonates. In recent time, for example, faith communities in the United States have engaged strongly on global warming.[4] They tend to connect with the moral dimension of climate change, i.e., via their persistent concern for social and intergenerational justice, and environmental stewardship (often summarized under the phrase "creation care"). Such a framing would not necessarily resonate with business leaders whose persistent concern is with the bottom line, investments and markets, competitiveness in the U.S. or world economies, and so on.

TABLE 1: Common Barriers to Civic Engagement on Climate Change

Psychological-cognitive barriers	Internal processing of climate change information may undermine motivation to engage on the issue. De-motivating emotional responses to climate change information commonly include: a sense of being powerless and overwhelmed, denial, numbing, a belief of being exempt from the threat, blaming others, wishful thinking or rationalization that the problem will resolve on its own through the help of experts, displacement of attention on other problems, apathy, fatalism, and other forms of "capitulatory imagination" (Loeb, 2004; see also Immerwahr, 1999). These types of cognitive and emotional responses are particularly common in response to issues which are scary, ill-understood, difficult to control, overwhelming, and in which people are complicit, such as global climate change (Moser, forthcoming b). Common cognitive barriers include not understanding the issue (causes) or not seeing the relevance of climate change impacts or solutions to one's daily life; misunderstanding, confusion, or disagreement with the actions, policies, or strategies proposed to address climate change; an unattractive future vision painted in people's imagination (often one of doom); and lack of resonance with the framing and language in which climate change is being discussed.
Social barriers	Individuals are embedded in social networks, form social identities, engage in social interactions, and adhere to varying degrees to social norms that suggest what counts as appropriate or inappropriate behavior. If engaging in civic action on climate change portrays a particular social identity, produces a social stigma, or reflects social norms in conflict with people's desired identity and accepted norms, they are unlikely to engage in this particular type of civic action. If civic engagement takes "too much" time or resources, and is inconvenient or too demanding given other daily concerns and competing obligations, even people sympathetic to the cause may not get involved. Finally, individuals—deeply embedded in society through socialization, institutions, and modern-day habitual activities—may not question or see alternatives to common emission-generating behaviors, and resist calls for alternative behaviors. As long as everyone else still drives their cars, why should they get out of theirs?
Political barriers	Individuals may be generally disinterested in political matters, prefer to leave political activism to others, and/or may feel deeply disenfranchised from the political process, and instead focus on matters of personal concern, impact, and influence. Some may hold a belief that government or industry or some other "other" will rise to the occasion and take care of the problem (a form of political transference). Others may not believe that existing institutions are failing in their responsibilities, thus why should they do anything that may be inconvenient? A related response is blaming others for the problem and/or projecting responsibility for remedial action onto those who will develop the necessary technological fix. Yet others, wedded to tradition and habit, may simply refuse to do anything different or new. Scientific uncertainty about the causes, urgency, or solutions of a problem can serve as a convenient rationale to hold on to the status quo.
Other structural, economic, institutional, and technological barriers	Even if the internal psycho-cognitive and external social and political barriers could be overcome, a person may still face structural barriers, such as lack of a convenient or economically-feasible alternative technology, existing laws and regulations, lack of public infrastructure, political institutions and electoral processes heavily controlled by vested interests, and so on. Information channels and communication infrastructure may also hinder engagement, even in this modern "information age." Generally heavy filters against the overabundance of information, declining newspaper readership, continued reliance on television as the main news source for Americans, and increased reliance on, and high selectivity among, internet news sources (The Pew Research Center for The People and The Press, 2004) together limit depth of coverage and understanding of any issue. Moreover, the political economy of the media industry, with its ever-growing concentration of media ownership, and—arguably—consequent narrowing of the range of news and diversity of voices heard in mass communication channels does not offer individuals the breadth of views that may allow them to form a well informed opinion. More typically, people exist in rather homophilous socioeconomic-political-informational environments that are rather isolated from other, yet similarly homophilous, sections of society (Rogers, 2003).

Local and state governments (Rabe, this volume), students (Levine, this volume), or low-income communities would have yet different concerns, understandings, and values that effective communication must tap into. However subtle, different audiences need to be addressed in audience-specific ways that match frame, message content, and language with their specific information needs, pre-existing knowledge, and concerns.

Framing Climate Change

Naming and framing an issue is one of the most fundamental challenges for communicators, especially for an "invisible" global problem such as climate change. According to Lakoff, frames are "mental structures that shape the way we see the world" (Lakoff, 2004). Frames—expressed and suggested through language, images, gestures, and the messengers who use them—"shape the goals we seek, the plans we make, the way we act, and what counts as good or bad outcome of our actions" (ibid.).

Audience-specific communication thus also means making global climate change "local" in more than the geographic sense. While people generally relate better to the things they can directly feel, experience, or see, making global warming "local" means connecting it with anything that is salient to them.

> "Making global warming "local" means connecting it with anything that is salient to people.

The task of framing—and re-framing as an issue evolves in public consciousness and political process—then is to identify those frame(s) that promise to be most powerful to a particular group of social actors. Frames are strategic tools of social movements and their counter-movements (Goffman, 1974). The history of public debate of climate change in the United States (but more recently also in Europe and Australia), in which climate contrarians have deeply influenced the framing and discussion of the issue attests to the power of framing and the power of access to the media channel that would promote these frames (McCright and Dunlap, 2001, 2003).

In recent communication of climate change in the United States, an important transition has begun to occur where the issue has not just been framed as an "environmental" issue, but instead as a social, economic, technological, educational, security, and moral issue. For example, the Apollo Alliance (http://www.apolloalliance.org/), for example, invoking the compelling national focus on putting the first man on the moon, envisions a future of clean energy, technological, economic, and moral leadership, and secure employment. Leaders in the environmental justice community who have taken up the climate issue tend to focus on fairness, health, safety, and well-being (see, e.g., http://www.ejcc.org/). Such alternative frames help individuals, organizations, and communities already active on other issues see how their work might be impacted by climate change. It also helps people not yet concerned with global warming find common cause and ground. In short, not every conversation must begin or end with climate. Instead, we can open the door to climate change from a different side of the common house.

Messenger Choice

To reach audiences heretofore unengaged, it is also important to carefully select the messenger. In the United States, scientists, environmental NGOs, contrarians, and the media have dominated climate change communication in the past, resulting in a perception of global warming as a scientific, (still) highly uncertain, and controversial environmental issue. To alter that perception, change the groups of people involved, reach into sections of civic society yet-to-be engaged, and to cross social divides, the choice of messenger is a critical strategic decision. Effective communication matches the messenger both with the message and with the audience. In the first match, it is critical to understand messengers as part of the framing: Former CIA Director James Woolsey talking about the need to reduce oil consumption as a matter of national security (while also benefiting the climate) is an example of matching messenger with message content and frame (Rolling Stone Magazine, 2005). Messengers also need to be credible to the audience being addressed. The CEOs of companies involved in the Pew Center for Global Climate Change's Business Environmental Leadership Council (see http://www.pewclimate.org/)

are more persuasive spokespeople to other business leaders because they are like them and understand the pressures and issues CEOs have to deal with on a daily basis. Such "people like us" (or PLUs) are important for an audience's personal comfort, identity, and group-internal norms and cohesion. Often, PLUs (especially if we know and trust them personally) have greater credibility and legitimacy than someone who does not know an audience's circumstances as well.

Beyond Information and Emotional Appeals to Create Urgency

To overcome the psychological and cognitive barriers to engagement, communicators must be critically aware of the role of information and emotions in behavior change. While a minimum amount of information is necessary to understand that a problem exists, why it exists, what its implications are, and what one can do about it, information and understanding by itself typically do not suffice to motivate behavior change or civic engagement (see extensive discussion in Moser and Dilling, forthcoming). In some instances, simply learning more about an issue can lead individuals to believe that they have actually "done something." Similarly, trying to get people to "care more" about an issue through appeals to fear or guilt can backfire and produce exactly the opposite results than intended (i.e., denial, numbing, and disengagement) unless a series of conditions are met that actually enable people to translate their concern and fear into appropriate actions that reduce the danger (Moser, forthcoming). A communication strategy that does not very quickly tell people that there are feasible solutions with which they can begin to address the problem, and what specific and appropriate actions individuals can take to help, is more likely to hinder than help the outreach and engagement effort. Moreover, because people feel manipulated and numbed by exposure to these messages, emotional appeals are frequently not enough any more to break through disinterest, apathy, and information filters. Surprise and novelty are needed instead.

> "It is critical now for communicators to engage individuals and communities by creating a sense of feasibility, collectivity, and urgency.

Thus, rather than inundate audiences with more information or scary images of a dark future, it is critical now for communicators to constructively engage and support individuals and communities by creating a sense of feasibility, collectivity, and urgency arising from fact, experience, common sense, and a moral sense of responsibility. This would include elements such as the following:

- Global warming is not a future problem but a present challenge
- A concerted collective effort is needed to address it, and many people, communities and businesses are already involved
- Any delay now makes later solutions more difficult and expensive
- Those who have taken first steps have actually saved energy and money, rather and improved quality of life and local economies (less traffic congestion, cleaner air, etc.)
- We already have models (and metaphors) for acting responsibly and reasonably in our long-term interest without sacrificing terribly in the present (saving for retirement or college, insurance, etc.)

Scientific Confidence, Practical Solutions, and Hope

Looking over the past 20 years of research, what is remarkable is not how much remains uncertain, but how strong the scientific consensus on climate change has grown. At the same time, there remains a (albeit lessening) public impression—fed by climate contrarians and common media practices—that there still is scientific controversy over the basic notion of human-caused climate change (ABC News/TIMES/Stanford University, 2006). Scientists themselves share in the responsibility for this situation, partly because they frequently emphasize the unknown more than the known, and partly because they have taken pains to respond to every misinformation and misleading statement by climate contrarians. There is good reason to do so—misinformation should not be left standing unchallenged and opportunities to educate the public should not be missed. But this pattern has left the pro-environmental and scientific side on the

defensive. It is always more powerful to define the frame than respond to someone else's.

What is needed now from scientists and other communicators to strengthen public resolve is at least threefold. First, they must continue to convey the state of the science and how the confidence in scientific understanding has grown over time. Second, they must never overstate the scientific confidence with which aspects of climate change are known. But to retain credibility while conveying confidence, communicators should lead with what is most certain, and discuss remaining uncertainties in light of what is well understood. Typically, people respond constructively to uncertainty (because they live with uncertainty all the time!) when they have some bearings that help them navigate unknown territory. In fact, it is an unsubstantiated claim that we need to know everything for sure before we can act (decisions to go to war, to invest in the stock market or to act on medical diagnoses come to mind). Finally, communicators should provide context for the evolving scientific understanding of climate change, i.e., that it is the nature of science to always push back the frontiers of the unknown, and in the process, stumble upon findings that require revisions of what was previously thought to be known.

Perhaps more important than continuing to defend the science of climate change is moving toward communicating solutions. Polls suggest that most Americans now are convinced that climate change is real, even if this belief is not very solid or anchored in deep understanding of the issue (ABC News/TIME/Stanford University Press, 2006). Once people are engaged and realize the challenge that climate change presents, they instinctively want practical solutions. Those inclined to engage in civic action may be particularly predisposed to wanting to take or support actions. The polls also suggest that Americans do not know what solutions are feasible, important, or available, and that they cannot see their own role in tackling the problem. Thus, what is needed more now is information about practical solutions, help, support from others, encouragement, and empowerment (e.g., DeYoung, 2000; Kaplan, 2000; Gärling et al., 2003). What is needed now is a sense of hope. Tapping into people's desires for a better future, their social identities and aspirations, and cultural values that promote individual and collective action and engagement for the greater good (e.g., ingenuity, responsibility, stewardship, being a good team player, and leadership) can all increase people's motivation besides the more instrumental reasons (such as personal economic gain, competitiveness, legal compliance, and so on).

> "Defining a positive vision of a worthwhile future must become a key focus of communication, outreach, and civic engagement efforts in coming years.

To help individuals stay engaged on an easily overwhelming issue, sort through complex issues, understand difficult trade-offs, and change habitual thoughts and behaviors, communicators must identify and engage sources of social support. Typically, interpersonal and small-group dialogue can address these needs much better than mass communication received in the privacy of one's living room. Neighborhood-based eco-teams, green-living projects on campuses, science cafés, church-based discussion groups and many other examples exist already in the United States and Canada that illustrate these insights. In such small settings, the power of social norms, accountability, identity, and personal ties is brought to bear on the barriers and resistance to change. They also allow individuals to be acknowledged and appreciated for their efforts, to serve as role models, and to provide very immediate positive feedback on one's actions.

A Compelling Positive Vision

Finally, most of what people hear about climate change in the news media, from scientists and environmental advocates involves projections of frightening futures, possible doom for treasured environments and species, and mental images of disaster and havoc. It is a very difficult scenario to face, and consequently, many don't. Moreover, citizens alive today are unlikely to see greenhouse gas concentrations in the atmosphere return to pre-industrial levels, or even 2005 levels, even with a concerted global mitigation effort. We and the next

generation may well become witness to a deteriorated climate for many regions of the world.

While this seems easily discouraging, communicators would be remiss in creating a sense of false hope by suggesting otherwise. The time lags built into our social and climate systems requires that communicators think hard about what "success" would look like, and how to sustain civic engagement when positive feedback is not immediately to be had from an unforgiving atmosphere. Defining a positive vision of a worthwhile future must become a key focus of communication, outreach, and civic engagement efforts in coming years, including defining measures of progress (Olson, 1995). Communicators must convey these indicators of forward achievement just as much—and maybe even more—than what is wrong or not yet happening. While it is unrealistic to expect that citizens will stay focused on climate (or any other) through the ups and downs of issue attention cycles (Downs, 1972), a vision of a compelling positive future will be essential as a compass through challenging times.

CONCLUSION

In the absence of committed federal leadership in the United States, a burgeoning level of activity at lower levels of government and in civil society has characterized America's response to climate change in the past two years. Local and state governments, pioneering businesses, religious communities, students on dozens of campuses across the country, traditional environmental and social advocacy groups, and a range of newly created groups have emerged as "grassroots leaders" on climate change. Even if and when they succeed in building sufficient political pressure on federal leaders to force nationwide policy changes, their role in societal response to climate change is not complete.

What the already-existing civic engagement illustrates is that countless leverage points exist to initiate social change (from the bottom-up, top-down, and across sectors). Smaller changes plow the ground for bigger ones while spreading an important symbolic message to those who are not yet engaged. It is the typical pattern of pioneers and early adopters to create the conditions for a majority of actors eventually to adopt some innovative practice or technology (Rogers, 2003). Given the long-term nature of climate change, civic engagement as a reflection of a community's or society's social capital will be essential in dealing with the impacts of climate change and addressing not just mitigation but also adaptation needs. Moreover, civil society (including parents, religious leaders, and educators) plays a critical role in fostering the deeper social changes (e.g., in values, social norms, and practices) that will support the implementation of bigger structural changes required as global warming progresses.

In this paper, I have tried to illustrate how effective communication can play a critical role in mobilizing people for civic engagement. The tasks of attaining deeper understanding of climate change, persuading people of its urgency, constructively and respectfully debating the value choices that underlie societal responses, envisioning a positive future, and supporting individuals and groups in actually changing behavior and policies, point to an important shift needed in future communication efforts. Rather than just continuing with and finessing our mass communication in "wholesale" fashion, there are important reasons for—if not replacing—at least complementing such efforts with audience-specific, small-group, dialogic, "retail" approaches to talking about climate change. It is this type of much-needed face-to-face communication that stirs the hope that communication could play an essential role in forming trustful social bonds, building and maintaining social capital, facilitating civic engagement on climate change, and ultimately rejuvenating the democratic political process in the United States.

> "Wholesale" mass communication efforts must be complemented with audience-specific, small-group, dialogic, "retail" approaches to talking about climate change.

NOTES

1. This paper draws on and extends a discussion of the role of communication in building a social movement for climate protection in a forthcoming book chapter (Moser, forthcoming a). It also builds on the insights generated in a multi-collaborator, three-year project led by myself and Lisa Dilling (University of Colorado, Boulder), summarized in a forthcoming anthology from Cambridge University Press (Moser and Dilling, forthcoming); for further information, see http://www.isse.ucar.edu/communication). The author would like to thank the organizers and participants of the Climate Politics in North America conference for helpful discussion and feedback on a previous draft of this paper.

2. Expressing concern over climate change and general support for political action by government or industry in opinion polls, while indicative and encouraging, is a long way from actively engaging in civic action. Examples of such recent polls can be found in ABC News/TIME/Stanford University (2006), PIPA (2005), and Brewer (2005).

3. For a full discussion of these roles, see Moser (forthcoming a).

4. See, e.g., The Interfaith Climate Change Network, http://protectingcreation.org/, Web of Creation, http://www.webofcreation.org/, or the Eco-Justice Programs of the National Council of Churches of Christ, http://www.nccecojustice.org/climatehome.htm.

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