

WORKSHOP PAPERS

The Post-Kyoto Climate: A Gloomy Forecast

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I. INTRODUCTION

In 1992 at the Rio Earth Summit most of the countries of the world signed the Framework Convention on Climate Change (FCCC) in which they committed themselves to stabilizing greenhouse gas “concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”¹ It took thirteen years for the first protocol with binding emissions limits to come into force, and it will have been in force only seven years when it expires in 2012.² During the thirteen years of negotiation and backsliding before it came into effect, the amount of carbon dioxide in the atmosphere increased by nearly seven percent, from about 356 parts per million (ppm) to 380 ppm.³ Many of these molecules will be in the atmosphere for centuries, and it will take hundreds of millennia until they are removed from the ocean-atmosphere-biosphere system and safely incorporated into carbonate rocks.⁴

Meeting in Bali at the end of 2007, the Conference of the Parties (COP) to the FCCC established a roadmap for what comes next: the post-Kyoto framework will be agreed upon in Copenhagen in December 2009 and will go into effect in

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1. United Nations Framework Convention on Climate Change art. 2, May 9, 1992, 1771 U.N.T.S. 107 (entered into force Mar. 21, 1994) [hereinafter UNFCCC].

2. This of course is the Kyoto Protocol. For its provisions, see Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 11. 1997 U.N. Doc. FCC/CP/1997/L.7/Add.1 (entered into force Feb. 16, 2005), available at <http://unfccc.int/resource/docs/convkp/kpeng.html>.

3. NAT’L OCEANIC & ATMOSPHERIC ADMIN., ESRL DATA, available at ftp://ftp.cmdl.noaa.gov/ccg/co2/trends/co2_annmean_mlo.txt (last visited Aug. 11, 2008).

4. For a graphic representation, see Global Warming Art, Carbon Dioxide Residence Time, http://www.globalwarmingart.com/wiki/Image:Carbon_Dioxide_Residence_Time_png (last visited Aug. 11, 2008). For fuller descriptions, see David Archer, *Fate of Fossil Fuel CO2 in Geologic Time*, 110 J. GEOPHYSICAL RES. C09S05 (2005) (providing a description of the carbon cycle); TYLER VOLK, CARBON RISING (2008) (providing a popular account).

2013. Maybe. The United States is key to this process because the lack of American participation limits how far and how fast the European Union (EU) can go because the EU puts itself at a competitive disadvantage by controlling its emissions when the United States does not control theirs. For a similar reason, as well as others, it is highly unlikely that China and India will undertake serious commitments to control emissions unless the United States acts decisively to reduce its own emissions and shows much greater willingness than it has done thus far to fund mitigation and adaptation projects in less developed countries and to transfer technology. The U.S. is also important because some countries, fewer than there used to be, will simply follow the American lead.⁵

If there is strong leadership from the next administration, the U.S. Congress will pass an emissions trading bill in its next session.⁶ In his first year of office, in addition to shaping and implementing this domestic emissions trading system, the next president will also negotiate American participation in the post-Kyoto regime. For many Europeans, the Americans are on probation when it comes to climate change. A new president will have a relatively short time to show that the United States is serious and can play well with others. If he fails to do this, there will be a serious threat of trade sanctions and litigation.⁷

This timeline creates an exciting opportunity for American academics and policy-wonks. There is a relatively short, well-defined window in which to influence American policy on a complex and technically challenging issue. The climate change policy world now has the feel of one of America's "great awakenings," periods in which "anything goes," and new religions, sects, and denominations form and reform. However, a kind of conventional wisdom is already beginning to congeal. In this article I will review some of the proposals that are gaining traction, outline the actual policy problem that we face, show why the American (and therefore) global response is likely to be inadequate, sketch what I think it would take to address this problem successfully, and finally draw some conclusions.

5. Johanna I. Lewis, *China's Climate Change Strategy*, VII CHINA BRIEF 9, 9-13 (2007); see generally, Dale Jamieson, *Adaptation, Mitigation and Justice*, in PERSPECTIVES ON CLIMATE CHANGE: SCIENCE, ECONOMICS, POLITICS, ETHICS 217, 217-248 (Walter Sinnott-Armstrong & Richard. Howarth eds., 2006).

6. Even though both major party presidential candidates (Obama and McCain) favor emissions trading regimes, it will take strong presidential leadership to enact meaningful legislation, especially since there will be other extremely difficult issues competing for attention (e.g., the Middle East, health care, tax reform).

7. *EU Warned of Trade War Over Climate Measures*, EURACTIV, Jan. 28, 2008 <http://www.euractiv.com/en/trade/eu-warned-trade-war-climate-measures/article-169878> (last visited Aug. 11, 2008); Andrew L. Strauss, *The Legal Option: Suing the United States in International Forums for Global Warming Emissions*, 33 ENVTL. L. REP. 10,185 (2003); JOSEPH SMITH & DAVID SHEARMAN, CLIMATE CHANGE LITIGATION: ANALYSING THE LAW, SCIENTIFIC EVIDENCE AND IMPACTS ON THE ENVIRONMENT 3-21 (2006). Interestingly, the Lieberman-Warner bill, the leading emissions trading proposal before the United States congress, contemplates trade restrictions against carbon-intensive products from regions not governed by carbon control regimes. See America's Climate Security Act of 2007, S. 2191, 110th Cong. (2007). For an analysis of the trade restrictions provisions, see Slayde Hawkins, Note, *Skirting Protectionism: A GHG-Based Trade Restriction under the WTO*, 20 GEO. INT'L ENVTL. L. REV. 427 (2008).

II. PROPOSALS FOR A POST-KYOTO FRAMEWORK

The challenge, from the perspective of American policy, is threefold: to design a domestic policy that will reduce emissions; to be a responsible actor in establishing an international regime that will fulfill the US commitment under Article 3 of the FCCC; and finally, to effectively link these activities and commitments.

In the American policy context, there is little sympathy for allowing domestic policy to be driven by international commitments.⁸ The focus is on a domestic system that can be appropriately linked to relevant international regimes.⁹ Much of the discussion has centered on comparing the strengths and weaknesses of a domestic carbon tax with an emissions trading regime. While economists generally favor taxes over trading regimes, in this case the weight of informed opinion is solidly on the side of emissions trading.¹⁰ The financial services industry is a strong advocate of emissions trading from which it would benefit enormously, and many people believe that any new tax is politically unacceptable. Moreover, in principle, an emissions trading regime can be designed that would mimic many of the desirable features of a carbon tax.

The importance of technological innovation and diffusion is also an important theme in the American debate. The physicist Martin Hoffert has argued for years that what is needed is an “Apollo” program directed towards remaking the energy system.¹¹ This theme has been picked up by the Apollo Alliance, and has influenced the national Democratic party.¹² The focus on technology often spills

8. An exception is Stiglitz who favors a global environmental tax on emissions. See Joseph E. Stiglitz, *A New Agenda for Global Warming*, ECONOMISTS’ VOICE, July 2006, http://works.bepress.com/joseph_stiglitz/1/. An even more dramatic exception is Baer and others associated with ecoequity who have advocated embedding climate change policy in the broader framework of “Greenhouse development rights.” See PAUL BAER, TOM ATHANASIOU & SIVAN KARTHA, *THE RIGHT TO DEVELOPMENT IN A CLIMATE CONSTRAINED WORLD*, (2007), <http://www.ecoequity.org/docs/TheGDRsFramework.pdf>.

9. Barrett has specifically addressed the idea of “interlocking” agreements. See Scott Barret, *Proposal for a New Climate Change Treaty System*, ECONOMISTS’ VOICE, Oct. 2007, <http://www.bepress.com/cgi/viewcontent.cgi?article=1240&context=ev>.

10. Exceptions are New York City Mayor Bloomberg and failed presidential candidates Gore and Dodd. See Sewell Chan, “Bloomberg Calls for Tax on Carbon Emissions,” *City Room*, <http://cityroom.blogs.nytimes.com/2007/11/02/bloomberg-calls-for-tax-on-carbon-emissions/> (Nov. 2, 2007) (last visited Aug. 11, 2008). For more arguments in favor of a carbon tax, see Carbon Tax Ctr., <http://www.carbontax.org> (last visited Aug. 11, 2008). Both major party presidential candidates favor cap and trade. On the politics see Drake Bennett, *Emission Control*, BOSTON GLOBE, Dec. 18, 2005, at K1; Tom Redburn, *The Real Climate Debate: To Cap or to Tax?*, N.Y. TIMES, Nov. 2, 2007, <http://www.nytimes.com/2007/11/02/us/politics/04web-redburn.html>. For an view in favor of emissions trading, see ROBERT N. STAVINS, THE BROOKINGS INSTITUTION, *A U.S. CAP-AND-TRADE SYSTEM TO ADDRESS GLOBAL CLIMATE CHANGE 7-13* (2007), available at http://www.brookings.edu/papers/2007/10climate_stavins.aspx.

11. Joseph B. Verrengia, *Scientists Urge Major Push to Develop Clean Energy*, SEATTLE TIMES, Oct. 29, 1998, at A19; see also Martin I. Hoffert et al., *Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet*, 298 SCI. 981, 981-987, Nov. 1, 2002.

12. Apollo Alliance, <http://www.apolloalliance.org/about.php> (last visited Aug. 11, 2008). The economist Thomas Schelling also emphasizes the importance of technological innovation in addressing this problem. See

over into an interest in geoengineering approaches to reversing climate change, a topic that has recently begun to capture more attention.¹³

Some of the most visible work on American emissions control regimes is being done by the Harvard Project on International Climate Agreements, Resources for the Future, and the Pew Center on Global Climate Change.¹⁴ While it would be misleading to reduce a rich body of work that is largely concerned with exploring options to a set of policy prescriptions, some dominant themes are emerging. I have already identified one theme: the focus on national and regional policies and agreements that can be “spun up” to an international regime. A second theme involves framing the climate change problem as primarily an economic problem and secondarily a technology problem.¹⁵ Finally, the third theme rejects the idea of an overarching “law of the atmosphere” or a new international order, instead focusing on diverse, pragmatic, country- and region-specific steps. Rather than contemplating a single regime for stabilizing climate, much of this work envisions yoking diverse regimes (including, for example, trade regimes) to this purpose. The picture that emerges seems to suppose that the problem of climate change can be solved from within the prevailing systems of governance and values though the application of economic instruments and modes of reasoning.

III. THE REAL PROBLEM

These approaches to climate change should be evaluated, not on the basis of whether they are founded on good economics or rely on leading theories of international relations, but on whether they can contribute to solving the actual problem that we face. Our challenge is not to do good science nor even to establish an international climate change regime. The goal is to keep our commitments under the FCCC.

As I have pointed out, virtually every country in the world, including the United States, is legally bound by the Framework Convention on Climate Change, whose

ultimate objective . . . is to achieve . . . stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropo-

Thomas C. Schelling, *Climate Change the Uncertainties and What They Imply About Action*, ECONOMISTS' VOICE, July 2007, <http://www.bepress.com/ev/vol4/iss3/art3/>.

13. Dale Jamieson, *Ethics and Intentional Climate Change*, 33 CLIMATIC CHANGE 323, 323-336 (1996); Paul J. Crutzen, *Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?*, 77 CLIMATIC CHANGE 211, 217 (2006).

14. Belfer Center for Science and International Affairs, Harvard Project on International Climate Agreements, http://belfercenter.ksg.harvard.edu/project/56/harvard_project_on_international_climate_agreements.html (last visited Aug. 11, 2008); Remarks by Eileen Claussen, President, Pew Center on Global Climate Change, http://www.pewclimate.org/press_room/speech_transcripts/june232003.cfm (last visited Aug. 11, 2008).

15. This is especially true in the most influential academic literature. To its credit, the Pew Center keeps a sharp eye on the politics.

genic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.¹⁶

What exactly counts as “dangerous” is a difficult question that involves complex scientific and evaluative judgments. The EU has effectively defined “dangerous anthropogenic interference” as a two degree centigrade increase in Earth’s mean surface temperature from the pre-industrial baseline. In order to have a serious chance of staying under that ceiling, atmospheric concentrations of carbon dioxide will have to stabilize at 450-550 ppm (the preindustrial baseline is generally taken to be about 278 ppm and atmospheric carbon dioxide is now at 383 ppm). Because molecules of carbon dioxide stay in the atmosphere from anywhere between a few years to virtually forever, it will take a very long time for concentrations to stabilize even after emissions have been reduced. We have already experienced a warming of 0.8 degree centigrade from the pre-industrial baseline, and we are committed to at least as much additional warming from the carbon dioxide already in the atmosphere. People can argue around the margins about these numbers and about what exactly is the threshold for dangerous anthropogenic interference with the climate system, but the basic shape of the policy problem is robust with respect to a wide range of reasonable definitions and assumptions. If we are to avoid dangerous interference in the climate system, global emissions will have to peak in the next ten to fifteen years, and then rapidly decline to well below fifty percent of 1990 emissions by 2050.

What this means is that the window for taking action is small and closing rapidly, especially when viewed against the background of the time horizon required for technology development and diffusion, and infrastructure turnover and replacement. Many of the technologies that are discussed as solutions to climate change would not come online soon enough to allow us to avoid dangerous interference with the climate system (e.g., nuclear power, hydrogen cars, new generations of coal-fired electricity plants), even if they were successfully developed and deployed, given the time-frame in which emissions must be radically reduced (though they may be helpful in addressing further iterations of this problems that would arrive in the even further future).

Moreover, we face this challenge in a world in which carbon dioxide emissions are continuing to increase at roughly two ppm annually.¹⁷ While the EU stabilized or modestly reduced its emissions from the 1990 baseline, other high per capita emitters such as the United States and Canada continue to increase

16. UNFCCC, *supra* note 1, art. 2.

17. See NAT’L OCEANIC & ATMOSPHERIC ADMIN., *supra* note 3. In 2004, carbon dioxide emissions were 377.55 ppm; in 2005, emissions increased 2.2 ppm to 379.75 ppm; in 2006, they increased 2.1 ppm to 381.85 ppm; and in 2007, they increased 1.87 ppm to 383.72 ppm. *Id.*

their emissions (sixteen percent for the United States through 2002, twenty-five percent for Canada through 2005).¹⁸ Large developing countries such as China and India also continue to rapidly increase their emissions but they are still relatively poor and have much lower per capita emissions than North American, European, or Australasian countries.¹⁹ China is nationally the world's largest emitter but its per capita emissions are still only about one-fifth of those of the United States.²⁰ Moreover, as much as one-third of their emissions may be due to export industries.²¹ Finally, it seems undeniable that the poorest countries in the world will need to increase their energy consumption if they are to have any hope of lifting their people out of poverty.

In addition to these concerns, there are quite different perspectives on this problem that will have to be bridged. The European view is relatively firm with respect to the magnitude of cuts that are needed, the importance of a fully global regime, and the centrality of binding timetables and targets. The G77, on the other hand, is divided and unstable. Some G77 countries, such as Saudi Arabia and Kuwait, are major oil producers; they have allied themselves with climate change deniers and those who want to "go slow." Other G77 countries, such as Vanuatu, are already beginning to disappear due to sea level rise. These threatened nations have organized themselves into the Alliance of Small Island States (AOSIS) and have been strong advocates for immediate reductions in greenhouse gas emissions. Other G77 countries, such as China, India, and Brazil, are strong independent actors and have no hesitation about asserting their own national interests. Despite these differences, virtually all G77 countries agree on the importance of both participatory and distributive justice in any climate regime. Finally, the United States remains something of a mystery in this process. In recent years the United States has become more responsive to the view that there is a serious problem to be solved, yet it has not even proposed, much less taken, serious action directed towards solving it. All eyes are now on the new administration.

18. Press Release, Energy Info. Admin., Total U.S. Carbon Dioxide Emissions from Fossil Fuels Increased by 1.3 Percent in 2002 – About the Average Growth Rate Since 1990 (June 27, 2003) available at <http://www.eia.doe.gov/neic/press/press216.html> (last visited Aug. 11, 2008); see also *Carbon Dioxide in Atmosphere Increasing Faster than Expected*, ASSOCIATED PRESS (Wash., D.C.), Oct. 22, 2007, available at <http://www.ihf.com/articles/ap/2007/10/22/healthscience/NA-SCI-US-Carbon-Increase.php>; Sustaining the Environment and Resources for Canadians, "Canadian Environmental Sustainability Indicators 2007 – Highlights," http://www.ec.gc.ca/environmentandresources/CESIHL2007/CESIHL2007_e.cfm (last visited Aug. 11, 2008).

19. See Climate and Atmosphere, CO₂ Emissions, <http://earthtrends.wri.org/text/climate-atmosphere/variable-666.html> (last visited Aug. 11, 2008).

20. Neth. Env'tl. Assessment Agency, China Now No. 1 in CO₂ Emissions; USA in Second Position, <http://www.mnp.nl/en/dossiers/Climatechange/moreinfo/Chinanowno1inCO2emissionsUSAinsecondposition.html> (last visited Aug. 11, 2008).

21. Christopher Weber et al., *The Contribution of Chinese Exports to Climate Change*, 36 ENERGY POL'Y 3572 (2008).

My major concern is that succeeding in making policy is not always the same as succeeding in solving a real-world problem. Given the difficulty of the problem of climate change and the complexity entailed by any negotiation, my fear is that even if the world achieves a policy success it may still fail to solve the real problem that we face. Creating a regime that prevents global emissions from increasing as predicted by “business as usual” scenarios will require policy innovation of great brilliance and skill. Such an achievement may well be regarded as a success, but this policy success may in fact constitute a failure in resolving our real problem, and this failure may be obscured by our success in putting some inadequate but innovative agreements and policies in place.

IV. WHY THE POLICY PROBLEM IS DIFFICULT TO SOLVE

A. COGNITIVE AND AFFECTIVE FAILURES

Like it has with all creatures, evolution has endowed human beings with a set of cognitive and affective capacities that condition our relations with the world. These capacities have been honed by our forbears’ experience with the kinds of problems that they faced. However climate change presents us with a problem whose very nature challenges our capacities for thought and action. Some of these features are as follows.

Climate change is a technical problem that requires a scientific understanding of the world in order to grasp. Many people have little knowledge of science or scientific reasoning and are even repelled by them.²² Among those who are scientifically equipped to understand this problem, many are insensitive to its human causes and consequences.

Climate change is a complex problem in that it involves non-linear connections, feedbacks, and higher-order properties that occur at different levels of organization. This is one reason why it is difficult for people to imagine that a global warming could cause a catastrophic cooling or a change in ocean currents (for example).

Climate change is best represented probabilistically. Global warming does not mean that every region would become warmer or that every day would be warmer in a warmer world than it would be in a cooler world. Schneider uses a gambling metaphor: Global warming loads the dice in favor of increased temperatures, changes in precipitation, and extreme events.²³ We tend to ignore the tails of probability distributions, and focus on the most likely outcomes as if they were certain.

22. Transcript of Oral Argument at 23, *Massachusetts v. EPA*, 127 S. Ct. 1438 (No. 05-1120) (Justice Scalia commented, “I told you before I’m not a scientist . . . That’s why I don’t want to have to deal with global warming, to tell you the truth”) available at http://www.supremecourtus.gov/oral_arguments/argument_transcripts/05-1120.pdf; see also *Massachusetts v. EPA*, 127 S. Ct. 1438, 1471 (2007) (Scalia, J., dissenting).

23. STEPHEN H. SCHNEIDER, *GLOBAL WARMING: ARE WE ENTERING THE GREENHOUSE CENTURY?* 283 (1989).

As I noted earlier, carbon dioxide stays in the atmosphere centuries after it is emitted and continues to affect climate. Many of these effects take decades or perhaps even centuries to be felt because they are buffered by other global systems (e.g., oceans, terrestrial ecosystems). Thus, the most serious effects of climate change will be felt in the very distant future. As individuals we do a poor job of thinking about such remote effects of our action. Because of discounting, our systems of economic decision-making typically underemphasize these effects. When it comes to politics, very little beyond the next election cycle captures much attention.

The causes and effects of climate change are geographically unbounded. Although environmental scientists see the world as systematically bound together, this perspective is novel or foreign to most people. Events that occur beyond national boundaries are of relatively little concern, as evidenced by news reporting and political campaigns. Yet, the worst impacts of climate change will occur in developing countries, far from the consciousness of those who emit most of the greenhouse gases.

Climate change has multiple effects including sea level rise, increased frequencies of droughts, storms, and extreme temperatures.²⁴ When effects are multiple and sometimes even paradoxical, it is difficult for people to attribute them to a single cause.

Many of the effects of climate change will be indirect. Second-order impacts, such as species extinctions and changes in agricultural patterns, are likely to result from first-order impacts, such as changes in temperature and precipitation patterns. Second-order impacts will in turn give rise to third-order impacts in economic, social, and political relationships. People have difficulty linking such indirect impacts to an initial cause.

Many of the climate change effects on human welfare will be invisible. Not many people will be killed or harmed by the first-order effects; instead they will be affected by its second- and third-order effects on standard of living, food availability, health, and so on. In most cases the deaths and harms will be statistical rather than identifiable, and people have trouble identifying with statistical victims. Moreover, individual deaths and harms will largely not be attributed to climate change. You won't read in the obituary column of the newspaper that some particular person has died of climate change.

B. COLLECTIVE ACTION PROBLEMS

Climate change is the world's biggest collective action problem. This is especially apparent when individuals are viewed as the relevant actors, but the same analysis applies to other levels of agency, including the nation-state. It is in

24. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT, SUMMARY FOR POLICYMAKERS (2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

the interests of each actor to refrain from reducing their own emissions while trying to cause others to reduce theirs. Thus they will be able to reap the benefits of emissions reduction without incurring the costs. Since each agent can reason in this way, it is difficult to motivate any agent to bear costs to address this problem.

As Steve Gardiner has pointed out, there is also an inter-generational version of this collective action problem.²⁵ When a generation is regarded as an agent, it has even less incentive to reduce emissions than contemporaneous agents. For each generation experiences the climate that has been bequeathed to them by previous generations. The costs they incur to reduce emissions will primarily benefit future generations rather than themselves. Since this is the position of each generation, no generation has much incentive to reduce emissions.

The problems I have mentioned are extremely difficult to overcome. Appeals to aggregate economic advantage and enlightened self-interest are not enough to motivate action in such circumstances. The economist Cameron Hepburn has said that if one wanted to design a pill to put an end to humanity, it would have many of the characteristics of the problem of climate change.²⁶

C. MORALIZING CLIMATE CHANGE

Collective action problems are sometimes overcome when agents act on a perceived moral obligation to contribute to the public good. While instilling a sense of moral obligation to reduce emissions has a role to play in solving the climate change problem, features of this problem make it difficult to moralize.

A paradigm moral problem is one in which an individual acting intentionally harms another individual; both the individuals and the harm are identifiable; and the individuals and the harm are closely related in time and space.

Consider Example 1, the case of Jack intentionally stealing Jill's bicycle. The individual acting intentionally has harmed another individual, the individuals and the harm are clearly identifiable, and they are closely related in time and space. If we vary the case on any of these dimensions, we may still see the case as posing a moral problem, but its claim to be a paradigm moral problem will be weaker. Consider some further examples.²⁷

- Example 2: Jack is part of an unacquainted group of strangers, each of which, acting independently, takes one part of Jill's bike, resulting in the bike's disappearance.
- Example 3: Jack takes one part from each of a large number of bikes, one of which belongs to Jill.

25. See Steve Gardiner, *The Pure Intergenerational Problem*, 86 *MONIST* 481 (2003).

26. Cameron Hepburn, *Climate Ethics and Public Attitudes to Risk and Inequality*, Address at the Global Justice and Climate Change Symposium at Oxford University (Sept. 21, 2007).

27. These examples were first discussed in Dale Jamieson, *The Moral and Political Challenges of Climate Change*, in *CREATING A CLIMATE FOR CHANGE: COMMUNICATING CLIMATE CHANGE AND FACILITATING SOCIAL CHANGE* 475 (S. Moser & L. Dilling eds., 2007), and were inspired by some examples discussed by Jonathan Glover, *It Makes No Difference Whether Or Not I Do It*, 49 *PROC. ARISTOTELIAN SOC'Y* 171-190,

- Example 4: Jack and Jill live on different continents, and the loss of Jill's bike is the consequence of a causal chain that begins with Jack ordering a used bike at a shop.
- Example 5: Jack lives many centuries before Jill, and consumes materials that are essential to bike manufacturing; as a result, it will not be possible for Jill to have a bicycle.

While it may still seem that moral considerations are at stake in each of these cases, this will be less clear than in Example 1, the paradigm case with which we began. The view that morality is involved will be weaker still, perhaps disappearing altogether, if we vary the case on all these dimensions simultaneously.

Consider Example 6.

- Acting independently, Jack and a large number of unacquainted people set in motion a chain of events that causes a large number of future people who will live in another part of the world, from ever having bikes.

For some people the perception persists that this case poses a moral problem. This is because the core of what constitutes a moral problem remains. Some people have acted in such a way that harms other people. However, most of what typically accompanies this core has disappeared. In this case it is difficult to identify the agents, victims, or causal nexus that obtains between them; thus, it is difficult to assign responsibility, blame, and so forth.

These "thought experiments" help to explain why many people do not see climate change as an urgent moral problem. Structurally, the moral problem of climate change is largely the same as Example 6. A diffuse group of people is now setting in motion forces that will harm a diffuse group of future people. Indeed, if anything, the harms caused by climate change will be much greater than the loss of the opportunity to have a bicycle. Still, we tend not to conceptualize this as a moral problem because it is not accompanied by the characteristics of a paradigm moral problem. Climate change is not a matter of a clearly identifiable individual acting intentionally so as to inflict an identifiable harm on another identifiable individual, closely related in time and space. Because we tend not to see climate change as a moral problem, it does not motivate us to act with the urgency characteristic of our responses to moral challenges.

A further problem is noted by Dan Gilbert:

... global warming doesn't ... violate our moral sensibilities. It doesn't cause our blood to boil (at least not figuratively) because it doesn't force us to entertain thoughts that we find indecent, impious or repulsive. When people feel insulted or disgusted, they generally do something about it, such as whacking each other over the head, or voting. Moral emotions are the brain's call to action.

Although all human societies have moral rules about food and sex, none has a moral rule about atmospheric chemistry. And so we are outraged about every

breach of protocol except Kyoto. Yes, global warming is bad, but it doesn't make us feel nauseated or angry or disgraced, and thus we don't feel compelled to rail against it as we do against other momentous threats to our species, such as flag burning. The fact is that if climate change were caused by gay sex, or by the practice of eating kittens, millions of protesters would be massing in the streets.²⁸

All these factors make it difficult for anyone to write an "Uncle Tom's Cabin" of global warming.

D. GLOBAL JUSTICE

Rather than seeing climate change as a problem of individual morality, another approach involves seeing it as a problem of global justice. Ugandan President Yoweri Museveni is reported to have said that climate change is "an act of aggression by the rich against the poor."²⁹ Although the problem of climate change has some of the elements of a problem of global justice, it is not like standard cases of international injustice (such as an aggressive war) in which one nation is wholly responsible for the injustice and another country is simply the victim. The problem of climate change does not lend itself naturally to nation-state analysis. Everyone in every country is to some extent implicated in changing the climate. Those who are most responsible are those who are rich, whether they live in Paris, Sydney, Delhi, or Shanghai. There are more people more responsible for climate change (at least viewed from the perspective of personal contributions, measured by per capita emissions) in China and India than there are in Australia or New Zealand.

V. A HETERODOX VIEW

We need to look at the problem of climate change in a new way, and a good place to begin is to think again about the origins of our failure to address it adequately thus far.

Rhetorically, U.S. rejectionism has been based on science but it is really based on status quo bias and ideological resistance. The ideology is nationalist, anti-global governance, anti-regulatory, and pro-market, pro-property rights.³⁰

28. Dan Gilbert, "It's the End of the World As We Know It and I Feel Fine," *Stumbling on Happiness*, http://www.randomhouse.com/kvpa/gilbert/blog/200607its_the_end_of_the_world_as_we.html (July 2, 2006) (last visited Aug. 11, 2008).

29. *UN Council Hits Impasse Over Debate on Warming*, N.Y. TIMES, Apr. 18, 2007, available at <http://www.nytimes.com/2007/04/18/world/18nations.html>.

30. See Myanna Lahsen, *Experiences of Modernity in the Greenhouse: A Cultural Analysis of a Physicist "Trio" Supporting the Backlash Against Global Warming*, 18 GLOBAL ENVTL. CHANGE 204, 207 (2008), available at http://sciencepolicy.colorado.edu/admin/publication_files/resource-2590-2008.05.pdf; Naomi Oreskes, *The American Denial of Global Warming* (2007), http://www.youtube.com/watch?v=2T4UF_Rmlio, at 53:50.

The status quo bias is one that is deeply embedded in our psychology, but it can be overcome.³¹

Once it became clear early in the Clinton administration that the U.S. government was not going to dramatically challenge either the status quo bias or the ideology on which U.S. rejectionism is based, the strategy of those who are concerned about climate change has been to focus on what can be done on the margins: individual action, voluntary action, actions at the state and local level, action through the courts, working with the private sector, emphasizing “no regrets” strategies etc.

However, as the aspirations have become smaller, the challenge has become larger because of the front-loaded nature of the problem. Now we find ourselves at a moment very much like the late 1980s and early 1990s when transformative change is possible (even if not likely). Yet much of the policy community is still in a Clintonesque mindset of proposing what is likely to amount to small, incremental steps around the margins. And, indeed, as I have suggested, what is a small step with respect to stabilizing climate would be a huge political and policy success—and that in itself could be part of the problem. Even if the U.S. does establish a cap and trade system, the question will be to what extent such a system will actually reduce emissions as opposed to simply providing a bonanza for the financial services industry. Similarly, the next administration will be active in negotiating a post-Kyoto agreement, but it is still an open question whether it will take seriously the claims of developing countries, the need for the U.S. to radically (and not just modestly) reduce its emissions, and the requirement that the U.S. be subject to an international regime that may impose sanctions on it.

I think it is important to use this moment to encourage and develop the small initiatives that are underway, but also to try to bring about the transformative changes that would actually be required to solve this problem. These changes would involve new attitudes and values concerning national sovereignty, global governance, global responsibility, and global justice. I am highly skeptical that such an urgent and almost unimaginably difficult problem—whose solution would require substantially altering the way we live—can be adequately addressed in any other way.

Climate change is an expression of something even larger that is affecting multiple earth systems: anthropogenic global environmental change. The most effective path for managing climate change requires responding to the larger problem of global environmental change. This would require us to see that our problems are not primarily in the oceans, the atmosphere, or in the forests, but in our institutions of governance, our systems of value, and our ways of knowing.

In a 1997 article, a group of distinguished scientists led by Stanford's Peter

31. See generally William Samuelson and Richard Zeckhauser, *Status Quo Bias in Decision Making*, 1 J. RISK & UNCERTAINTY 7 (1988).

Vitousek reviewed the broad range of human impacts on nature. What they found was that between one-third and one-half of Earth's land surface has been transformed by human action; carbon dioxide in the atmosphere has increased by more than 30% since the beginning of the industrial revolution; more nitrogen is fixed by humanity than all other terrestrial organisms combined; more than half of all accessible surface fresh water is appropriated by humanity; and about one-quarter of Earth's bird species have been driven to extinction. Their conclusion was that "it is clear that we live on a human dominated planet."³² More recently the Millenium Ecosystem Assessment project issued its final report. This comprehensive analysis, involving more than one thousand scientists over a four-year period, concluded that

human activity is putting such strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted.³³

There are various ways of measuring the human impact on nature. In 1986 Vitousek and his colleagues approached this problem by calculating the fraction of Earth's net primary production (NPP) that is appropriated by humanity, thus not directly available for other forms of life. (NPP is the amount of biomass that remains after primary producers (autotrophic organisms such as plants or algae) have accounted for their respiratory needs.) What they found is that humanity probably appropriates about 40% of Earth's terrestrial NPP.³⁴

Another approach to assessing the human impact on nature is ecological footprint analysis, pioneered by William Rees and Mathis Wackernagel.³⁵ The ecological footprint of a nation, community, or individual is the amount of land area required to produce the resources it consumes and to absorb the wastes it generates, given its standard of living and prevailing technology.

There are many complications here that invite further discussion. Various technical and methodological questions can be asked about how we can contend with gaps in the data and how we can account for the fact that much of what we consume is produced elsewhere.³⁶ There are also different ways of looking at the significance of these figures. But whatever we think about these disputes, the

32. Peter M. Vitousek et al., *Human Domination of Earth's Ecosystems*, 277 *SCIENCE* 494, 494 (1997).

33. MILLENNIUM ECOSYSTEM ASSESSMENT, *LIVING BEYOND OUR MEANS: NATURAL ASSETS AND HUMAN WELL-BEING* 5 (2005), available at <http://www.maweb.org/documents/document.429.aspx.pdf>.

34. Subsequent studies using different methodologies have produced a range of figures, but Vitousek et al.'s original claim seems roughly correct. See Peter M. Vitousek et al., *Human Appropriation of the Products of Photosynthesis*, 36 *BIOSCIENCE* 368, 368 (1986). For a review, see Christopher B. Field, *Sharing the Garden*, 294 *SCIENCE* 2490, 2490 (2001).

35. See MATHIS WACKERNAGEL & WILLIAM E. REES, *OUR ECOLOGICAL FOOTPRINT: REDUCING HUMAN IMPACT ON THE EARTH* (1996).

36. For discussion of these and other issues see, e.g., JEROEN VAN DEN BERGH & HARMEN VERBRUGGEN, *SPATIAL SUSTAINABILITY, TRADE AND INDICATORS: AN EVALUATION OF THE "ECOLOGICAL FOOTPRINT"* (1999).

bottom line is clear. According to WWF's *Living Planet Report*, some time in the late 1980s humanity began to consume resources faster than the Earth can regenerate them, and this gap is increasing every year.³⁷ The planetary impacts of the highly consumptive life-styles practiced in the industrialized world cannot be generalized: the fact is that the planet simply cannot stand many people who consume like Americans,

Addressing this problem would require changes in many of our institutions. A new international scientific body should be constituted to assess the broader problem of global environmental change. Perhaps this could be called the "Intergovernmental Panel on Global Environmental Change." National governments should provide strong support for the development of the emerging field of sustainability science.³⁸ Colleges and universities should organize themselves around problem-oriented research and teaching as well as around academic disciplines. Lawyers and political theorists should work on creating a systematic law of the atmosphere, as well as complementary regimes for the oceans and biosphere. Economists should consider what sorts of economic institutions would be required to regulate our economies in this new world in which we find ourselves.

These are only speculative ideas. Initiating, developing, promoting, and implementing such ideas would require strong social movements around the globe, organized around such concerns as respect for nature as well as ideas of global justice and enlightened self-interest. While the possibility of this may seem remote, it is important to recognize that transformative change does not require everyone to be an activist. What is required is an activist minority, a permissive majority, and strong political leadership. Such change has in fact occurred at other moments in recent history. The creation of new political and economic institutions for governing the post-World War II world was a product of such a transformative moment. The challenge that we face is in some ways similar (and of course in some ways different) to the challenges faced in that era.

VI. CONCLUDING REMARKS

Much of what I have said may sound like idle speculation but I think it is important to acknowledge how difficult this problem really is, and how widespread and systematic the changes are that would be required to solve it. These are not only changes in life-style (as important as they are), but also changes in attitudes towards global governance, national sovereignty, and perhaps even the nature of the good life.

The prevailing emphasis is on looking for piecemeal, ad hoc, pragmatic

37. See WWF, *LIVING PLANET REPORT 2006*, at 22 (2006), http://assets.panda.org/downloads/living_planet_report.pdf.

38. Robert W. Kates et al., *Environment and Development: Sustainability Science*, 292 *SCIENCE* 641 (2001).

solutions on the grounds that they are “realistic” and “politically possible.” But so far, in the United States in particular, we have not been able to successfully implement “realistic” and “politically possible” measures that meaningfully address the problem of climate change. While we focus on ever more modest steps, the real problem becomes increasingly urgent and intractable. We are approaching the point at which any real solution to the real problem will automatically be regarded as “unrealistic.” But at this point it is reasonable to wonder whether “unrealistic” approaches have any less chance of being adopted than “realistic” ones. Indeed, sometimes moving a negotiation to a wider domain allows trade-offs that can’t be made in a narrower framework. It is reasonable to be skeptical about the sort of transformational change that I am proposing, but we should also be skeptical about incremental approaches. For what they offer may well be policy success and climate disaster.