THE CENTER FOR INTERNATIONAL ENVIRONMENT & RESOURCE POLICY

ENERGY, CLIMATE, AND INNOVATION PROGRAM
THE FLETCHER SCHOOL
TUFTS UNIVERSITY

Key Research Needs for Global Climate Change Policy

Ted Mathys
Aaron Strong
Kelly Sims Gallagher
Nick Davidson
Ravi Manghani
Mieke van der Wansem
William Moomaw

June 2010

The ECI Program gratefully acknowledges the support of the William and Flora Hewlett Foundation and BP Alternative Energy.

The views expressed in this report do not necessarily reflect the views of any of the supporting institutions.

Energy, Climate, and Innovation Program (ECI)
Center for International Environment and Resource Policy (CIERP)

The Fletcher School
Tufts University
Cabot Intercultural Center, Suite 509
160 Packard Avenue
Medford, MA 02155

www.fletcher.tufts.edu/ierp

The Fletcher School at Tufts University was established in 1933 as the first graduate school of international affairs in the United States. The primary aim of The Fletcher School is to offer a broad program of professional education in international relations to a select group of graduate students committed to maintaining the stability and prosperity of a complex, challenging, and increasingly global society.

The Center for International Environment and Resource Policy (CIERP) was established in 1990 to support the growing demand for international environmental leaders. The Center provides an interdisciplinary approach to educate graduate students at The Fletcher School. The program integrates emerging science, engineering, and business concepts with more traditional subjects such as economics, international law and policy, negotiation, diplomacy, resourcemanagement, and governance systems.

The Energy, Climate, and Innovation Program (ECI) advances policy-relevant knowledge to address energy-related challenges and opportunities, especially pertaining to climate change. ECI focuses particularly on how energy-technology innovation can be better harnessed to improve human-well being, and the role of policy in the innovation process. Although ECI's outlook is global, we concentrate mainly on energy and climate policy within, and between, the United States and China. We also focus on how these countries influence the international negotiations on climate change, and the role of technology in the negotiations.

PRINTED WITH 100% WIND ENERGY
Supplied by Community Energy
Fowler Printing & Graphics

100% PC RECYCLED

This report was printed using 100% wind-energy on a paper made of 100% post-consumer waste fiber.

Contents

Executive Summary

Following the 15th Conference of the Parties (COP15) to the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen, Denmark in December 2009, the Energy, Climate, and Innovation Program (ECI) in the Center for International Environment and Resource Policy (CIERP), The Fletcher School, Tufts University carried out a consultative process with policymakers, scholars, and leaders from non-profit organizations regarding the current state of global climate change negotiations. *The purpose of this initiative was to identify specific analytical gaps and topics for scholarly inquiry that can be taken up by academic institutions and researchers in order to better serve international climate policy discussions in the future.*

The consultation team hosted working group discussions at The Fletcher School and conducted semi-structured telephone interviews with individuals from diverse professional fields and regions of the world from January – April 2010. A full list of those consulted is provided in Appendix A. From the wealth of insights that emerged, we identified recurrent themes and distilled them into specific research priority areas.

This white paper highlights those topics that the consultations revealed to be most pressing and in need of solid analysis and sound empirical research. The paper is neither about the politics of climate policy nor intended to be a prescription for next steps in climate change negotiations. The consultation team also makes no pretense toward comprehensiveness; we recognize that research has been done and is currently being done in some of the areas identified below and also that there are many worthy areas of research not identified by this consultative process.

The paper outlines four cross-cutting research needs, followed by seven priority research areas:

- financing;
- measurement, reporting, and verification;
- technology transfer and diffusion;
- the politics of international climate policy;
- legal structures;
- adaptation to climate change; and
- the role of trade policy in climate change policy.

In each area, a short description of the issues at stake and the associated analytical needs is given, followed by a set of specific research questions. We hope these questions serve as catalysts and inspirations for targeted research that is directly relevant to climate change negotiators and stakeholders in the months to come.

I. Cross-Cutting Research Needs

Tackling global climate change is an inherently complex problem, involving economic, environmental, political, technical, scientific, ethical and social considerations. As such, inter-disciplinary academic research is both fundamental and required. This research should not only be capable of employing methodologies from various disciplines (negotiation theory, political science, engineering, ecosystems science, etc.), but it should also be capable of asking and answering questions which are themselves multi-dimensional.

Based on our interviews with experienced negotiators, policy experts, and academics we have identified four primary areas of cross-cutting research needs:

- Need for case studies of climate change policy design and implementation;
- Need for the development of country-specific plausible low-carbon future storylines;
- Need for models and examples of effective capacity-building in both developed and developing countries; and
- Need for research on the process of international climate change negotiations.

CROSS-CUTTING RESEARCH NEED 1:

Case Studies

There are few case studies of climate change policy design and implementation. Case studies can provide a more focused, localized, empirical, and qualitative approach to understanding the implications of proposed policies than that offered by econometric models. The need for such studies is broad, ranging from analyses of good examples of developed countries achieving economic growth while simultaneously reducing carbon emissions, to case-based analyses of bilateral cooperation on financing for climate change mitigation. Forward-looking speculative case studies that analyze the potential domestic and foreign policy implications of implementing particular climate policies in particular countries at particular points in time are a related need. The ultimate goal of these studies is to discern which national-level policies work, which do not, how circumstances determine the outcome, and why.

Specific research questions:

- Which domestic climate change mitigation policies have been successful and why have they been successful?
- For speculative country-based case studies, research questions might take the following form: What would the implementation of a proposed policy mean for country X domestically, and what would it mean for country X's relationship with country Y?
- What examples, including non-climate environmental and development policies, do we have of financing policies and institutions that have been flexible enough to adapt to changing political dynamics and situations?
- Are there good examples of current bilateral agreements on financing for climate change mitigation, energy cooperation, or technology transfer?

CROSS-CUTTING RESEARCH NEED 2:

Plausible Low-Carbon Future Storylines

Fully elaborated, country and regional-specific storylines of economic and societal transition to a low-carbon future are needed. A subsequent consideration for research is how best to communicate these messages to large audiences. If climate change policy is to be successful, our interviewees suggest, it must be both holistic and realistic in its approach to mitigation and adaptation in the real-world situations in which policies are implemented.

The development of such storylines would have a two-fold benefit: it would provide specific situational insights into the requisite domestic policy steps for achieving such a transition, and it would also provide developing countries with a clearer trajectory for successful low-carbon development. The former is important in helping to create a more "bottom-up" process of communicating the individual experience of climate change policy (i.e. what will the world look like in a low-carbon future?), which may be important in generating domestic support for specific climate change policies. The latter is important in allaying what some have suggested are growing suspicions within developing country societies that climate change is being used as a tool by developed countries to restrict their development goals.

Specific research questions:

- What do the low-carbon pathway storylines look like on a country-by-country basis?
- What are the low-carbon pathway storylines in least developed countries, particularly countries in Africa, which have not received sufficient research attention?
- What are the economic and social components of policy scenarios that lead to innovation sufficient to guide such pathways?

CROSS-CUTTING RESEARCH NEED 3:

Effective Models of Capacity-Building

Many aspects of climate change policies rely on building effective capacity, especially in developing countries. Forms of capacity building include the technical and technological capacity for monitoring and verifying emission reductions, capacity for increasing the usage of low-carbon energy sources, and capacity for creating governance systems for regulation, for instance, to successfully administer the allocation of climate financing. Some of our interviewees pointed to the need for further research on how to build effective capacity.

Specific research questions:

- What are the current institutional requirements for capacity building on a country-by-country basis that will allow for effective administration of adaptation and mitigation funds?
- What are the funding requirements for capacity building? Can capacity building be effective without clear knowledge of the amount and nature of eventual funding to be administered?
- What are the country-specific technical and training requirements for developing countries to conduct national inventories, communication programs, and successful measurement, reporting and verification (MRV) regimes? What are the methodologies for identifying these requirements?
- What good examples from the development community do we have of successful capacity building for governance? What aspects of those situations apply to climate change mitigation and adaptation funding? How can these efforts be coordinated with the climate community?
- What methods for innovation and low-carbon technology R&D capacity building work in developing countries, especially least developed countries?

CROSS-CUTTING RESEARCH NEED 4:

International Negotiations Process

The negotiation process that preceded and occurred during COP15 in Copenhagen in December 2009 generated considerable controversy, and there is substantial uncertainty about how this process will play out as Parties move forward to COP16 in Cancun in late 2010. There was a considerable diversity of opinion among our interviewees about how negotiations should be organized both at the global level and at the operational level. For example, at the global level opinions differ regarding the need for substantial alterations to the current UN framework, and at the operational level there were a range of insights relating to the impact on the negotiations of the logistical processes during the COP itself. In light of this uncertainty and the breadth of opinions, targeted empirical research is needed on the process of climate change negotiations itself.

Specific research questions:

- What issues require open, transparent negotiations in full plenary and what issues can be successfully negotiated among a smaller subset of negotiating parties?
- To what extent does the timing and sequencing of negotiations influence the outcome?
- How might the three working groups / texts (the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (*AWG-KP*); the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA); and the Copenhagen Accord) be integrated? What are the process implications of current attempts to merge the Copenhagen Accord and the LCA tracks?
- What are the implications of using a "building block" approach to the process, in which action on issues about which there is broad agreement, such as Reducing Emissions from Deforestation and Forest Degradation (REDD+) and adaptation, precede negotiations on more intractable issues? Which issues are best suited for such a strategy? What might be the catalytic effects of employing such a building block strategy on the prospects of a future comprehensive agreement? What informative examples exist in other fields for successfully portioning issues within a negotiation process?
- What is the current and future role of other international fora, such as the Major Economies Forum and G20, in the process of climate change negotiations? Are these institutions capable of working in tandem with the UNFCCC on climate change policy? Are there specific topics or issues which might achieve more traction in these alternate fora? What are the impacts of these fora on the UNFCCC process and vice versa?

- What examples exist of formalized mediation and the use of neutral party negotiators that might be relevant to the process of climate change negotiations?
- What is the extent of the role and influence of civil society and NGOs in the current negotiation process?
- How are nascent environmental concerns related to greenhouse gas emissions, such as ocean acidification, treated in the current process and/or is the current process amenable to an expanded agenda of environmental issues?
- How are issues of trust affecting the politics of climate change negotiations? What lessons from political psychology and other successful trust-building negotiations might be applied to climate change negotiations?
- How is climate change different from other environmental issues and how do these differences affect the dynamics of climate change negotiations?

II. Priority Areas for Research and Analysis

Based on our interview responses, we have identified seven priority topics in need of further specialized research. Under each of these priorities we have included a series of research questions which would help inform the process of global climate change policy-making.

PRIORITY 1:

Financing Instruments

The Copenhagen Accord includes a prescription for setting up a "Copenhagen Green Climate Fund." Based on the responses of our interviewees, there is currently a great deal of uncertainty and diversity of opinion as to how such a fund should be constituted, administered, and actually function alongside other existing funding mechanisms. More broadly, our interviewees indicated a need to understand the relationship of the development and climate agendas. Further research on financing for developing country adaptation, mitigation, and MRV is needed.

Specific research questions:

- What funds are currently available and how might the Copenhagen Green Climate Fund be plausibly structured and organized?
- What governance schemes for other funds have been successful and what is the relationship (causal or correlative) of the fund, the governance structure, and the time window?
- In designing financing instruments, are there trade-offs between flexibility of the fund and adequate oversight? If so, what examples of successful flexible funds exist and why have they worked? Are such examples applicable to climate change?
- What is the relationship between the number of institutions involved in financing and the adequacy of the provision of funds? Do more institutions dilute funding?
- What is the relationship of climate funds to current Official Development Assistance (ODA)? What lessons from current ODA can inform conditionality provisions and governance for climate change mitigation and adaptation financing?
- How does the source of funding (bunker fuel levies, cap and trade schemes, foundations, private vs. public) influence the structuring and governance of the funds?
- How adequate are estimates of financing needs and how does this adequacy vary between adaptation funding needs, MRV funding needs, and mitigation funding needs?
- What does it cost, by country, to undertake an annual GHG inventory?
- Are there good models from disaster relief and risk pooling experiences that might be useful in the structuring of climate change adaptation funding instruments?

PRIORITY 2:

Measurement, Reporting, and Verification (MRV)

Few issues combine the technical and political dimensions of climate change policy more than that of measuring, reporting, and verifying 1) emissions reductions; 2) carbon storage and sequestration; and 3) the implementation of policy pledges. Numerous interviewees highlighted the fact that a successful MRV approach in both developed and developing countries is important for a functioning climate regime and urged more research both on how to do it and how to finance it.

Specific research questions:

- What are the technical options and/or constraints for measurement and verification? How do these options differ between MRV of fossil fuels and energy use verses MRV for land-use, land-use change, and forestry (LULUCF)? To what degree of precision are we capable of obtaining data that is spatially and temporally explicit? How will MRV needs change as we move toward an economy-wide climate change regime?
- How are the different aspects of MRV treated differently within the climate change regime? Specifically, what are the different pathways for ensuring MRV domestically and internationally? To what extent does this depend on differences between measurement and verification?
- What is meant by verification when it is discussed by policy-makers and negotiators? Is it validation of actual emissions reductions, audits of policy implementation, or both?
- What are the lessons from other international regimes that have used reporting and verification mechanisms? To what extent do these lessons apply to climate change?
- How are verification-relevant data gathered from remote sensing treated within the climate change regimes? To what extent has this communication contributed to the design and implantation of effective MRV instruments?
- What is the current status of communication between the observation science community and international negotiators about technical capacity, and how has such communication influenced the possibility for implementing REDD+ and other policy instruments?
- For MRV- related finance, what criteria are needed to determine what "counts" and what doesn't "count" when conducting inventories if MRV is not centralized? Are there successful examples of centralized oversight and verification for decentralized financing?
- Can MRV metrics be adequately compared globally?

PRIORITY 3:

Politics of Climate Change Policy

The level of trust and understanding between negotiating parties was a problem at COP15 and several interviewees suggested that there is a lack of thorough, empirical political science analysis of climate change politics, at both the international and domestic levels. Thus it is recommended that the political science community become engaged with the broad question: what are the politics of climate change policy?

Specific research questions:

- How are domestic climate politics affecting national policies and international negotiation positions?
- How are domestic climate politics explained, and why do they vary across countries?
- What are the political impacts of negotiation blocks within international climate change policy, and how have these roles changed over time?
- What role has/does political capital and leadership play in climate change policy setting and decision-making?
- What are the political considerations regarding sources of funding for climate change mitigation and adaptation?
- What role does civil society play in shaping international climate change negotiations?
- What are the politics of managing and setting expectations and goals for Conferences of the Parties?
- How important are political considerations of legitimacy and transparency in climate change negotiations? Does an effective climate change policy require broad-based, bottom-up political support?

PRIORITY 4:

Technology Transfer and Diffusion

Technology transfer is a cross-cutting issue itself: it plays a role in plausible storylines of low-carbon development in developing countries and is directly related to questions of financing instruments and international trade. Understanding what variables govern successful technology transfer involves a mix of economic, policy, and political science methodologies.

Specific research questions:

- What is technology transfer and how does it work?
- Empirically, what are the barriers to increased transfer and diffusion of low-GHG technologies?
- How do these barriers differ depending on the technology or target region?
- To what extent (or not) are intellectual property rights and concerns playing a role in limiting technology transfer?
- What is the role of the WTO and/or trade regulations in facilitating technology transfer? Can smaller multilateral and bilateral technology transfer agreements be successful, and if so, would their formal inclusion as part of a larger institutional framework affect this success?
- What role can/does technology transfer play in enhancing technical capacities for measurement, verification and validation of emissions reductions?
- What role can/does technology transfer play in increasing adaptive capacity in developing countries (rather than mitigation)?
- What role do R&D capabilities and national/technological systems of innovation play in technology transfer?
- How does the technology transfer term "enabling environment" relate to the innovation term "technological innovation system"?
- What role can/does technology transfer play in building capacity for innovation and research and development in the target country?
- How might climate technology centers based in developing countries collaborate most effectively with counterparts in industrialized countries to innovate and build capacity in developing countries?
- What are the 'best practices' for technology transfer and what possibilities exist for disseminating them?

PRIORITY 5:

Legal Structures

"Pledge and review" and "national schedules" as possible elements of an international climate change treaty were raised repeatedly in interviews. While much of the research on these topics is needed from a process and negotiation standpoint, targeted legal research on the "legally binding" status of such pledges is essential for a full-bodied understanding of the workings of such instruments.

Specific research questions:

- What is the legal nature of pledge and review? What are possible enforcement mechanisms and penalties for noncompliance?
- Which elements within a framework based on national schedules need to be legally binding and which do not in order for it to be successful?
- Are legally binding mitigation targets necessary for a successful climate treaty, or can the goals of the Parties be achieved with non-legally binding mitigation actions?
- What is the relationship between legally binding timetables and schedules and requirements for measurement, reporting and verification? Can one be had without the other, and if so, in what ways?
- In light of the Copenhagen Accord, what, if anything, is happening to the legal distinction between developed and developing countries?
- What is the menu of possible legal forms that a future climate change agreement or series of agreements might take?

PRIORITY 6:

Adaptation

From a societal and a policy perspective, adapting to climate change is a complex phenomenon, involving high-level policy decisions, sourcing and allocation of financing, and local and individual-level implementation. Research on the question of adaptation is clearly related to both cross-cutting research needs on process as well as research on financing instruments. Because adaptation may involve, as some of our interviewees pointed out, difficult "moral" decisions about how best to allocate finite financial resources, research specifically on adaptation issues is required.

Specific research questions:

- What is the current state of the resilience of infrastructure to climate change in developed and developing countries?
- What is the current state of country-specific National Adaptation Plans in the United Nations Framework Convention on Climate Change process?
- What are the examples of successful adaptation plans and why have they been successful? What information or data are required to improve these plans? Is enforcement necessary or desirable? Do we have sufficient case studies?
- How should decisions about the allocation of adaptation funds be organized?
- Is there a need for "MRV" for adaptation? How much oversight is needed and at what levels?
- What is the role of adaptation in developing country-specific low-carbon storylines?

PRIORITY 7:

Role of Trade Policy in Climate Change Policy

The relationship of trade regimes to climate change policy was highlighted by several of our interviewees, with varying opinions on whether this relationship should be deepened or not. Because of the fundamental relationship between fossil fuel emissions, land-usage, climate change and the global economy, trade and climate change are inherently linked, and some argue that the use of trade policy instruments in climate change policy will be necessary in order to achieve carbon market integration. More research on this area is essential if we are to understand these implications.

Specific research questions:

- What is occurring in bilateral investment treaties that may be relevant to climate change policies?
- How would international or domestic fossil fuel subsidy reform work in detail?
- How are low-carbon technologies currently treated in trade policy?
- How will trade policy affect (or not affect) the process of carbon market integration?
- What role, if any, will border tax adjustments play in climate change policy? What shapes current country-specific positions regarding border tax adjustments?
- How might 'bringing the trade regime into the equation' affect current climate change policy negotiations?
- What role will trade institutions like the WTO play in motivating and creating climate friendly trade policies?

Conclusion

The scope and magnitude of current research needs for global climate change policy are significant. By compiling and integrating the thoughts of many experts, each of whom analyze climate change from his/her unique negotiation, policy, or academic perspective, our hope has been to distill a product that will have real impact on policymaking by inspiring and catalyzing rigorous targeted research. In addition, we anticipate that the breadth of the issues considered in this paper, and specifically the cross-cutting research needs, will help to demonstrate the fundamental need for, and stimulate the increased use of, integrated and interdisciplinary research methods for climate change.

APPENDIX A:

List of Interviewees

(in alphabetical order)

Dr. Eileen Babbitt
Professor of Practice In International Conflict Management Practice,
The Fletcher School of Law and Diplomacy

Dr. Rosina Bierbaum
Director of the School of Natural Resources and Environment, University of Michigan

Ambassador Luis Alfonso De Alba
Special Envoy for Climate Change, Government of Mexico

Sylvia Cabrera
Vice Ministry for Multilateral Affairs and Human Rights, Government of Mexico

Dr. Jan Corfee-Morlot
Senior Economist and Policy Advisor for Climate Change,
Organisation for Economic Co-operation and Development

Dr. Heleen de Coninck
Group Manager, International Energy and Climate Issues
Energy Research Center of the Netherlands, Unit Policy Studies

Dr. Daniel Drezner
Professor of International Politics, The Fletcher School of Law and Diplomacy

Riley Duren
Chief Systems Engineer, Earth Science and Technology Directorate,
Jet Propulsion Laboratory, National Aeronautic and Space Administration

Prof. Daniel Esty
Professor of Environmental Law and Policy, Yale University

Dr. Adrian Fernandez Bremauntz
President of the National Institute of Ecology, Government of Mexico

Dr. Kevin Gurney
Associate Professor, Purdue Climate Change Research Center, Purdue University

Ambassador Louise Hand
Ambassador for Climate Change, Government of Australia

Dr. Alan Henrikson
Associate Professor of Diplomatic History, The Fletcher School of Law and Diplomacy

Dr. Michael Levi
Director of the Program on Energy Security and Climate Change,
Council on Foreign Relations

Dr. Bert Metz
Senior Fellow, European Climate Foundation

Dr. Chip Miller
Deputy Principal Investigator, Orbiting Carbon Observatory
Jet Propulsion Laboratory, National Aeronautic and Space Administration

Jennifer Morgan
Director, Climate and Energy Program, World Resources Institute

Dr. Robert Orr
Assistant Secretary General for Policy Coordination and Strategic Planning at the United Nations

Ambassador Friis Arne Petersen
Ambassador of Denmark to the United States of America

Daniel Reifsnyder
Deputy Assistant Secretary for Environment and Sustainable Development

Dr. Artur Runge-Metzger
Environment Directorate-General, European Commission

Ambassador Shyam Saran
Former Special Envoy for Climate Change, Government of India

Dr. Henrik Selin
Assistant Professor in International Relations, Boston University

Dr. Rob Stavins
Professor of Business and Government and Chairman, Environment & Natural Resources Faculty Group at the John F. Kennedy School of Government, Harvard University

Dr. Rober C. Stowe
Executive Director, Harvard Environmental Economics Program and Manager, Harvard Project on International Climate Agreements

Dr. Lawrence E. Susskind
Professor of Urban and Environmental Planning, Massachusetts Institute of Technology

Dr. Jim Watson
Director, Sussex Energy Group and Co-Leader of the Tyndall Centre's Climate Change and Energy Program

Dr. David A. Wirth
Professor, Boston College Law School

Senator Timothy E. Wirth
President of the United Nations Foundation, Former United States Senator from Colorado and Former Undersecretary of State for Global Affairs

Dr. Xiaowei Xuan
Associate Researcher, Development Research Center of the State Council, China

APPENDIX B:

List of Acronyms Used

AWG-KP	Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
AWG-LCA	Ad Hoc Working Group on Long-Term Cooperative Action under the Convention
CIERP	Center for International Environment and Resource Policy
COP	Conference of the Parties to the UN Framework Convention on Climate Change
ECI	Energy, Climate, and Innovation Program
GHG	Greenhouse Gas
LULUCF	Land-Use, Land-Use Change, and Forestry
MRV	Measurement, Reporting, and Verification
NGO	Non-Governmental Organization
ODA	Official Development Assistance
R&D	Research and Development
REDD+	Reducing Emissions from Deforestation and Forest Degradation Plus Forest Conservation, Sustainable Management of Forests, and Enhancement of Forest Carbon Stocks.
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

THE FLETCHER SCHOOL

TUFTS UNIVERSITY

Energy, Climate, and Innovation Program (ECI)

Center for International Environment and Resource Policy (CIERP)

The Fletcher School

Tufts University

Cabot Intercultural Center, Suite 509
160 Packard Avenue
Medford, MA 02155

www.fletcher.tufts.edu/ierp