

# **Proposal for New Investment in Faculty Hiring: Human and Policy Dimensions of Global Environmental Change**

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## **Introduction and Interdisciplinary Nature of Proposal**

Understanding, mitigating, reversing, and adapting to the impact of human actions on our environment is one of the defining challenges for our generation and generations to come. Smart and effective public policies can play a crucial role in preventing the depletion of important natural resources such as energy, water, air, and land, and in responding to the adverse side effects of human activities using these resources. With a new investment in faculty hiring, the University of Massachusetts Amherst has the opportunity to build on its current strengths and to become a lead research institution in the study and development of effective responses to the human dimensions of global environmental change through better theories, new empirical findings, and innovative public policies. We propose an investment in new faculty to build a critical mass of scholars on campus who study how public policy can promote sustainable resource use, the adoption of clean energy technologies, and a healthy environment.

The study of public policies that address the human dimensions of environmental change is inherently interdisciplinary. Climate change and effective mitigation and adaptation policy require interdisciplinary responses that bring ecological, technical, and social scientific expertise to bear. This topic draws on theories of individual behavior from economics and psychology, market failure from economics and resource economics, organizational and collective behavior from sociology and political science, and the impact of resource use from landscape architecture, planning and the ecological sciences. Integrative thinkers with large-scale planning, public policy, and social-ecological systems backgrounds are needed to understand and integrate aspects of the various disciplines that are critical to research and problem solving in this area.

Our campus currently has impressive research and faculty resources devoted to the environment and environmental policy, but we lack a coordinated research group connecting the many departments, programs, and projects involved. For instance, natural scientists and ecologists could use the knowledge of social scientists on issues such as cost effectiveness, marketability, political feasibility, or distributional impact, but do not always have a place to easily access that knowledge on campus. Such connections are crucial for establishing UMass as a leader in creating clean energy and sustainable solutions to the world's environmental challenges. For example, the 2008 UMass Clean Energy Working Group report highlighted the need for policy research and analysis for the development and diffusion of new clean energy technologies—getting the science right is not sufficient for getting innovations from bench to market.

Over the last two years, faculty from the departments represented in this proposal (which come from three different colleges) have been meeting to discuss the need for a strong core network and collaborative capacity across the campus in the context of environmental policy, with a particular focus on global environmental change. The efforts of this group have produced a new speaker series, new course proposals, ideas for networking events, and a \$1.1 million grant proposal to the MacArthur Foundation for a program in sustainable development practice.

However, our current informal structure limits what we can achieve. This proposal builds on the informal working group and adds “mortar” to create a more formal and solid network. This new network will create the capacity to link the social and natural sciences in the area of environmental policy and management so that our campus can respond to new research and funding opportunities. The network we are creating on campus, coupled with the cluster hires we are advocating, will help make UMass Amherst a global leader in an area that requires interdisciplinary research and coordination. To make this collaboration work, our proposal relies on and will work with the well-established interdisciplinary Center for Public Policy and Administration (CPPA).

## Our Request

We are requesting authorization to hire four positions at the assistant or associate professor level. Some or all positions would be joint hires between a department and CPPA.

1. *Sustainable Community Development* (LARP): The focus of this position is community planning with an emphasis on participatory planning and design processes, and the theories, public policies, and practices that inform and guide the physical planning and design of communities. Research areas include adaptive responses to climate change, transportation policy and planning, compact cities, smart growth, global urban planning issues, land use change, environmental and procedural justice, or community empowerment, viewed through a lens of sustainability.
2. *Economics of Clean Energy* (Resource Economics): This position will focus on the economics of energy and the environment with an emphasis on the economics of climate change. Relatively little is known about the interface between emerging energy technology (including conservation technology such as real time electric metering) and climate change policy alternatives, including design of effective cap and trade programs. Another priority research area for this position is the economics of carbon sequestration in forests and the tradeoffs between sequestration and the use of forest based biofuels for energy production.
3. *Environmental Conservation and Climate Change* (NRC): Possible research areas include, but are not limited to, the policy and/or social dimensions of cumulative effects of and adaptive responses to climate change and land-use change on ecological systems, integrated water resource management, wildlife/fisheries conservation, green construction, and low impact sustainable land development.
4. *Economics and Policy in Improving Environmental Quality* (Economics): Many dimensions of environmental quality, such as clean air, biodiversity, and climate stability, are public goods. Given that situation, private investments are difficult or impossible to recoup because their benefits are broad and cannot be easily limited, leading to “free-riding” behavior. National and international policies require carefully crafted institutional solutions to the resulting coordination problems. Possible research areas include the inter-temporal distribution of costs and benefits; “pollution shifting” and international trade agreements; and the economics of international climate accords.

The above requests were generated by faculty within each requesting department, working in conjunction with the interdisciplinary proposal team. We expect that these hires will not only contribute to their departments, but will provide opportunities for interdisciplinary collaboration across units through formal connections with CPPA, either as joint faculty with CPPA or as members of the CPPA-facilitated environmental policy network (discussed below). These new faculty, brought in as a cohort and connected through CPPA, will create new interdisciplinary opportunities. For example, the position requested by Resource Economics on the Economics of Clean Energy has direct relevance to LARP’s interest in Sustainable Community Development, in Natural Resource Conservation’s interest in Green Construction, and in the Economics Department’s research on the green economy. The positions also allow the opportunity for new research proposals related to “scaling effects” of climate change mitigation or adaptation from the local to the regional, national, and global levels. Moreover, this collaborative working group will undoubtedly provide opportunities to work with other campus research groups, such as Engineering’s Microwave Remote Sensing Laboratory and Geoscience’s Climate System Research Center. Indeed, the faculty hired under this proposal would complement those contemplated in the climate change modeling proposal that has also been submitted under this RFP.

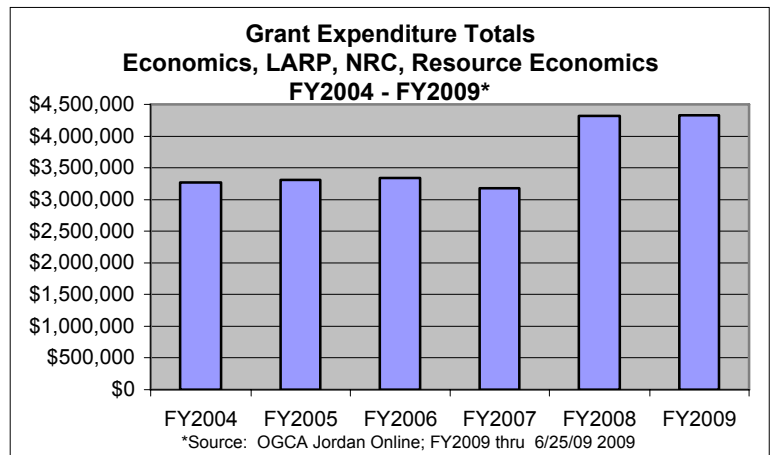
## Proven Excellence on Campus

Existing UMass faculty and departments participating in this proposal have proven their excellence through their published research in several areas related to the environment. (See appendix for names.)

- ***Evaluation and design of environmental policy***: UMass Amherst has significant strength in analyzing the operation and impacts of environmental policy, including newer policy designs focused on use of market mechanisms to manage environmental impacts and resource use. The Political Economy Research Institute (PERI) is one location for this work.
- ***Environmental justice***: Our campus has a significant strength in research on issues related to the uneven distribution of environmental harms, especially health impacts, in particular with respect to low-income communities or people of color.

- **Institutions and environmental policymaking:** Our campus has several faculty members whose work focuses on technical expertise in policymaking, information management for environmental policymaking, and the international context for environmental policy.
- **Environmental management:** LARP is developing an environmental management program with Xiamen University in China. Discussions about the possibility of developing a campus program in environmental management have been underway for two years.
- **Conservation:** NRC and LARP have many faculty working on relevant issues, including sustainable forest and water resource management, biodiversity, wildlife and fisheries conservation and land use and land conservation policy.
- **Clean energy and climate-related science:** Outside of the proposing units, enormous scientific expertise on campus focuses on the development of new renewable sources of energy, such as biofuels, microbial fuel cells, and wind energy. The Climate System Research Center focuses on the causes and consequences of global climate change.

**Funding:** We see the excellence of existing faculty through their success in competing for funding among government agencies and private foundations. The Environmental Institute reports that UMass Amherst faculty received more than \$40 million in grant funding for environment-related research in FY 2008. The chart shows that the departments submitting this proposal generate \$3-5 million per year in external funding, with a large increase in the last two years. We document examples of existing faculty successes in the appendix.



**Policy influence:** Senior UMass faculty have been influential leaders in conducting and translating research on environmental change and public policy:

- **James Boyce** (Economics) has just been appointed by California Gov. Arnold Schwarzenegger to the Economic and Allocation Advisory Committee to advise the state on the cap-and-trade system that will reduce California greenhouse gas emissions to 1990 levels by 2020.
- **Paul Fissette** (NRC) was invited by the National Academies to serve on an expert panel to explore the scientific and technical issues related to implementing energy and sustainability initiatives throughout the U.S. Capitol Complex.
- **Ray Bradley** (Geosciences) and **Peter Haas** (Political Science) contributed to the Nobel Prize-winning work of the Intergovernmental Panel on Climate Change.
- The work of **Robert Pollin** (Economics and PERI) on the green recovery and green jobs was influential in the Obama administration's economic stimulus plan.

**Increasing demand from students:**

All of the core departments in this proposal have seen increasing interest and demand for teaching and research on environmental issues from undergraduate and graduate students. For instance, Resource Economics has seen its majors climb from 35 in 2001 to more than 200 in 2008-09. The Economics Department and Political Economy Research Institute have a thriving Environmental Working Group for graduate students and faculty across disciplines and the Five Colleges, with 76 members. Natural Resources Conservation's graduate and undergraduate programs (e.g., Forestry, Wildlife and Fisheries Conservation, Environmental Science) are extremely strong on the ecological sciences side, but desperately need more offerings to provide social science/environmental policy perspectives. LARP has seen an increase in graduate enrollment, and a strong demand for revenue-positive joint degree programs with international universities. CPPA has seen an increase in inquiries from prospective students interested in environmental policy, and some of the Center's best masters students are attracted here to study environmental policy.

***Other external markers of excellence:***

- National Resources Conservation: The *Chronicle of Higher Education's* (November 18<sup>th</sup>, 2007) latest Academic Analytics Faculty-Productivity Index shows that three NRC programs rank in the top ten nationally: Wildlife Sciences (4th), Forest Resources (7th), and Fisheries Science (10th).
- Landscape Architecture and Regional Planning: In the 2007 *Chronicle of Higher Education* measures, LARP was ranked eighth in the nation.
- The Department of Economics enjoys a worldwide reputation as the premier center for research and teaching in heterodox economics. In its last AQAD review in 2002, external reviewers glowingly described the department: "The Department of Economics is a jewel in the crown of the University of Massachusetts at Amherst...Many members of the faculty enjoy national and international reputations for the quality, originality, and relevance of their work."
- The Department of Resource Economics has established the Cleve E. Willis Experimental Laboratory and is a center of excellence in the application of experimental economics to environmental and natural resource policy. The Department has one of the top MS degree programs in the northeast.
- The Center for Public Policy & Administration already shares faculty with three of the above departments. In the Center's first ten years, CPPA faculty brought in over \$14 million in funding. CPPA is the highest rated public policy program at a public university in New England in the most recent *U.S. News and World Report* ratings.

**Managing and Sustaining the Human Dimensions of Global Environmental Change Cluster**

Interdisciplinary collaborations are difficult to develop and sustain in universities governed by departments and colleges. This proposed effort will be sustained by its affiliation with the Center for Public Policy and Administration (CPPA) as the focal point for transforming this cluster of hires and existing faculty into a vibrant, collaborative research network and initiative. CPPA is the hub of interdisciplinary public policy research, teaching, and engagement on our campus, making it the ideal bridge to the campus community on environmental policy research and teaching. Because CPPA shares faculty with nine departments in four different colleges, the Center has developed a proven track record in developing and managing interdisciplinary activity in research, teaching, and outreach. We would expect all of the new hires, regardless of joint status, to be involved in creating a substantially enhanced environmental policy specialization within CPPA that will include new courses of interest to graduate and undergraduate students in many programs across campus.

In addition to facilitating the development of an intellectual community focused on environmental policy, CPPA has other resources to contribute. The Center can offer new faculty research assistance and some limited seed funding for projects. CPPA and the other departments will support new hires with grant proposal preparation assistance.

*Leadership and timeline:* Many of the faculty involved in the creation of this proposal (plus others) will serve as leaders for the creation of this new intellectual community on campus. CPPA will convene an environmental policy steering committee to have input in the detailed position descriptions for any hires coming out of this proposal. In 2009-2010, the steering committee will act as a liaison to each departmental search committee to ensure that any opportunities for cross-fertilization in recruiting, interviewing, and screening candidates are taken advantage of. The committee will also continue the work of the last two years to create a new Human and Policy Dimensions of Global Environmental Change network on campus to further develop the intellectual community and to organize meetings and seminars. In 2010-11, the steering committee will work with CPPA to ensure that new faculty have mentors and that seminars and other meetings of the environmental policy community on campus are well underway to welcome the new scholars.

*Assessing effectiveness:* We will assess the investment's effectiveness by the collaborations generated, the number and size of successful funding proposals, the number of graduate students attracted, and the influence of the research on policy debates and decisions.

## **Support from departments and colleges**

As noted in the above descriptions of existing UMass strengths, departments and colleges have already contributed significant faculty and student resources to the development of expertise on environmental issues. Many of these units have searched for (or intended to search for) faculty in this area as replacement hires. Other departments in the colleges represented here (e.g. political science) have also searched for and/or hired environmental policy-related scholars in recent years. Participating departments have indicated that space would be available for these new faculty.

## **Ability to attract funding**

Adding faculty to the existing strengths of the campus would enhance our institution's competitiveness for both new and existing opportunities for external funding. Funding opportunities for environmental research and related projects have increased significantly in recent years, and many of those opportunities require interdisciplinary teams that include policy-related researchers. With growing knowledge of the role played by human activities in environmental problems—including climate change—these funding opportunities increasingly include support for policy research and analysis.

At the federal level, for example, the Environmental Protection Agency offers important funding for environmental research, with a budget increase of almost 35% over the past five years to \$10.5 billion (FY2010) and the emergence of such new divisions as the Office of Environmental Policy Innovation. An initiative launched in February 2009 by the National Science Foundation calls for greater collaboration between its social sciences and geosciences directorates in addressing environmental change, and augments support for interdisciplinary research related to environment, society, and the economy. Some opportunities may also arise for regional or state grants and contracts through the Regional Greenhouse Gas Initiative, the Massachusetts Department of Conservation and Recreation, the Massachusetts State Historic Preservation Office, or the Massachusetts Department of Energy and Environmental Affairs.

Private foundations have also turned their attention to environmental issues in recent years. When the Environmental Grantmakers Association was formed in 1987, it consisted of 12 members; today that number is 220 and growing. Major U.S. foundations such as Kresge, Ford, and Rockefeller have developed new giving programs to address environmental issues, and foundations have been recently established for the purpose of supporting environmental work (e.g., the ClimateWorks Foundation, funded with a joint pledge from the Hewlett, McKnight, and Packard Foundations of over \$1 billion). Indeed, of the 33 domestic foundations that reported grants of at least \$5 million in 2008, several directed their biggest awards—10 grants totaling almost \$125 million—to environmental action and research (*Chronicle of Philanthropy*, April 9, 2009). Other private foundations with a clear interest in this area include Pew, MacArthur, the Doris Duke Charitable Trust, the Water Environment Research Foundation and the Orton Family Fund. Private opportunities from the UN Environmental Program, the WHO, or the World Bank might also be available.

In particular, support for research and policy analysis related to climate change is on the rise. The Foundation Center estimates that U.S. foundations invested \$436 million to address climate change in 2007, and that foundation giving for climate change has increased nearly five-fold domestically since 1997 and nearly eight-fold internationally. Furthermore, more than 25% of foundation grants for climate change in developing countries in 2007 funded policy work.

Finally, CPPA has developed experience and expertise in managing complex interdisciplinary grants through its work on the Science, Technology, and Society Initiative. CPPA faculty and their research projects cross departmental and college lines, and many of those projects involve cross-institutional components that can be difficult for faculty to manage. Being able to draw on this expertise will enhance faculty PIs' ability to focus on their research rather than grant administration.

## **Prospects for the project**

We believe the most likely scenario for this project is very close to the best-case scenario. The interest among faculty in creating a network to connect environmental policy research with other research on climate change is clear from the enthusiasm that has greeted several meetings over the last two years. Given that interest, the "worst case" is that the campus community grows through some of the networking already underway. With greater collaboration and a critical mass of scholars focused on the policy side of climate change research, the best-case prospects for UMass Amherst leadership in this field are strong.

## Appendices

### Appendix 1: Recent Funding Successes

Some examples of recent externally funded projects reveals the range of competitive expertise already on our campus and the clear upward trajectory in bringing in external funds.

- Natural Resources Conservation has become much more competitive in NSF funding, with six faculty with NSF grants now compared with almost no NSF funding five years ago. Recent projects related to the environment:
  - Nearly \$500,000 for an NSF Faculty Early Career Development (CAREER) grant to Charles Schweik, (NRC & CPPA) on “The Open Source/Content Commons as a New Paradigm for Collaborative Scientific Research: A Research and Teaching Agenda.”
  - \$450,000 to Paige Warren and others to study the “ecological and evolutionary consequences of urbanization on multispecies plant-animal interactions.”
  - \$754,637 to Kevin McGarigal to develop “interactive vision tools to index and search biological image databases for natural resources conservation.”
  - \$476,000 to Francis Juanes and colleagues to investigate differences and similarities in how Pacific and Atlantic species of cod and salmon respond to climate forcing.
  - \$533,049 to Todd Fuller and Craig Nicolson to look at predictability and movement strategies in ungulates.
- Resource Economics: Recent grants related to the environment:
  - \$1 million U. S. Environmental Protection Agency grant to John Stranlund (Resource Economics), James Murphy (formerly Resource Economics & CPPA), John Spraggon, Timothy Cason, Vernon Smith, Stephen Rassenti, and David Porter on “Experimental Testbeds for New Applications of Environmental Trading Programs.”
  - A \$1.19 million grant National Science Foundation to Sylvia Brandt and an interdisciplinary team of researchers to study the effects of climate change on Mid-Atlantic fisheries.
  - A \$326,173 grant from the South Coast Air Quality Management District awarded to Sylvia Brandt and colleagues at University of Southern California to study the societal costs of traffic-related pollution.
  - Two graduate students were awarded the prestigious doctoral research grants from the Latin American Environmental Economics Program.
- Economics: Members of the Economics department have recently received funding for work in the area of the environment from the U.S. Department of Energy, the Center for American Progress, the Ford Foundation (\$854,000), Rockefeller Brothers Foundation (\$150,000), the V.K. Rasmussen Foundation (\$75,000), and Food and Water Watch (\$150,000).
- LARP: Grant and outreach funding to the department was \$1.6 million between 2006 and 2008. Funding was received for projects relating to Environmental Policy from the U.S. Forest Service (Ryan and Hamin), the USDA Urban Forestry program (Brabec), and the Canadian Embassy (Brabec). Professor Hamin is a co-PI on a \$2.7 million grant proposal to study offshore geohazards and coastal risk assessment. Faculty are co-PI’s currently on two interdisciplinary NSF grants with faculty from NRC, Plant Soil and Insect Science, and Food Science. With a series of new hires in the department in the past few years, productivity in faculty peer-reviewed publications have gone up dramatically from an average 8 per year between 2005 and 2007 to more than 20 per year in 2008 and 2009.

## Appendix 2: Relevant researchers at the University of Massachusetts Amherst

The campus already has a body of researchers conducting work related to several aspects of environmental and resource policy that cross a number of colleges. For instance, the Clean Energy Working Group report counted thirteen researchers in several colleges whose work relates to energy policy or to economic analysis and industry assessment. The colleges represented in this proposal include many faculty whose work relates to the human and policy dimensions of global environmental change:

- Anthropology: Krista Harper (Anthropology and CPPA)
- Economics: James Boyce, Michael Ash (CPPA and Economics), Robert Pollin
- Landscape Architecture and Regional Planning: Elizabeth Brabec, Mark Hamin, Jack Ahern, Elizabeth Hamin, and Robert Ryan
- Natural Resources Conservation: Charles Schweik (NRC and CPPA), Robert Muth, Bethany Bradley, Craig Nicolson, Paul Barten, Tim Randhir
- Resource Economics (pollution, natural resource, and food policy): John Stranlund, John Spraggon, Thomas Stevens, Sylvia Brandt (Resource Economics and CPPA), and Julie Caswell
- Sociology: Doug Anderton, Sanjiv Gupta, and Jen Lundquist
- Political Science: John Hird, Peter Haas, Dean Robinson

Other groups that have shown enthusiasm for this proposal include:

- Engineering: Paul Siqueira (Microwave Remote Sensing Laboratory)
- Geosciences: Ray Bradley (Climate System Research Center)