

# Consortium on Law and Values in Health, Environment & the Life Sciences

## Student Proposal Cover Page

### Applicant Information

Applicant Name: Miriam Fischlein Date: 03/22/09  
Project Title: Pathways toward an integrated renewable energy certificate market  
Department: Bioproducts + Biosystems Eng. College: College of Food, Agricultural and Natural Resource Sciences  
Home address: 1280 Raymond Ave, # 3 City & State: Saint Paul, MN Zip: 55108  
Faculty advisor name: Timothy M. Smith Email: timsmith@umn.edu  Not applicable  
Dept. Head's name: Shri Ramaswamy Dept. Head's email: shri@umn.edu  
Dean's name: Allen Levine Dean's email: aslevine@umn.edu

How did you hear about this funding opportunity? E-mail from Consortium

### Funding

Amount of funding requested: \$ \_\_\_\_\_

Funding justification: [a clear statement of what you will use the funds for without going into budget details]

This funding will allow me to gather data for and write a chapter of my doctoral thesis. I am requesting funding to cover travel expenses for conducting qualitative interviews of renewable energy market participants during the summer; and to cover my stipend during data analysis and writing in the fall.

### Approvals

*Check all appropriate approvals required for your proposal. Approvals must be obtained prior to receipt of funding. If you have applied for approval but have not yet received it, indicate that below.*

IRB Date submitted: In process – (exempt since questions pertain to organizations only) Number: \_\_\_\_\_  
 IACUC Date submitted: \_\_\_\_\_ Number: \_\_\_\_\_  
 Other Explain: \_\_\_\_\_

### For Use by the Consortium Office

The proposal is 1000 words or less excluding budget, biographies, references and citations.  
 The proposal includes a work plan with a specific timeline using months or quarters to identify work to be done and completion dates.  
 The proposal includes a 1-2 paragraph biography of the applicant and all co-investigators.  
 The budget form is complete including the funds sought for this project, other pending applications for this project, and the amount/source of matching or other funds.  
 The applicant's faculty advisor is copied on the application email. Professional students w/o advisors check NA.  
 All necessary approvals are pending or received.

Student Proposal  
submitted to the Consortium on Law and Values  
in Health, Environment & the Life Sciences

Miriam Fischlein  
Ph.D. candidate, Natural Resource Science and Management

## **Pathways toward an integrated renewable energy certificate market**

### **Project nature and importance**

Renewable energy has emerged as a central strategy for climate change mitigation in the electric power sector (Pacala & Socolow, 2004). This research proposes to address the patchwork of state policies for renewable energy and their interaction with private ventures, deriving lessons for the design of an integrated renewable energy market. With renewable energy certificates (REC), environmental benefits of renewable generation are sold separately from the physical unit of electricity. Given transmission constraints of the electric grid and the need for siting renewable generation in proximity to adequate resources, REC have become the instrument of choice for providing flexibility and innovation (Mozumder & Marathe, 2004). Faced with the alternative between building their own renewable capacity and purchasing RECs, utilities are expected to choose the least cost option (Berry, 2002).

The development of a national market for renewable energy, however, has not kept pace with these hopes. While market mechanisms are potentially powerful tools for achieving environmental policy objectives, their state-by-state implementation in the renewable electricity sector is not amenable to creating an integrated market. REC markets are modeled on pollution allowance trading schemes, but they differ in how markets are defined, allowances are created and uncertainty is structured (Chupka, 2003), resulting in heightened challenges for efficient market functioning.

In addition, compliance markets for renewable energy feature complex interactions with voluntary markets for renewable energy and carbon (Bird & Lokey, 2007) and regulated emissions allowances markets (Gillenwater 2008b). Another complicating aspect in REC markets is associated with the need to prevent double-counting (Gillenwater, 2008a) and provide assurance that RECs stem from eligible resources and geographic areas and are not past their compliance period (Berry, 2002). While most states have a certificate tracking system to ensure no double counting is taking place, many have left the definition of RECs and their certification to the private sector (Holt & Wiser, 2007). As a result, REC products are offered by a large number of purveyors and their certification is undertaken by several competing actors.

In view of these challenges, and of the urgent need to include electricity production and consumption in climate change mitigation efforts (Pacala & Socolow, 2004), I propose to

analyze the barriers and opportunities towards an integrated renewable energy market. More specifically, I will examine the uncertainties related to future carbon regulations and the interactions of state renewable portfolio standards with other environmental commodity markets. States have served as laboratories of climate change policy for the electric energy sector (Rabe, 2008). In the absence of binding harmonized rules in the REC market, they are the main driver of renewable energy market creation. The proposed project builds on my current research, which examines differences in incentive-based aspects of state renewable energy policy and their effect on technology deployment. Based on existing databases and reviews of legislative texts, I am mapping the landscape of existing state policies in the renewable energy sector, and developing a larger analytic framework to assess the synergies and contradictions resulting from this bottom-up approach to generating an integrated market.

Building on this effort, I want to more closely examine the dynamics of the renewable energy market in four geographically diverse states, MN, TX, GA and MA. MN and TX both have high levels of renewable energy policy and technology adoption. MN has the strongest renewable standard in the country, is 2<sup>nd</sup> in wind power deployment and has an important biomass resource. TX is the oldest REC market in the U.S. and is first in wind power deployment. GA and MA were included in the study since renewable energy plays a small or diminishing role in their overall electric energy system. GA is one of the states without a state renewable power mandate, whereas MA has a mandate, that has proven ineffective in driving renewable policy deployment. The four states also serve to contrast the functioning of REC markets in regulated (MN, GA) vs. deregulated (MA, TX) states.

In these four states, I plan to conduct 30 interviews this summer with participants in the compliance markets (regulators, utilities and regional tracking system organizations), and the voluntary renewable energy market (independent power producers, marketers, certifiers). My primary goal is to gain in-depth understanding of the development and evolution of the policy landscape for renewable energy. The four case studies will help identify the institutional set-ups that are most advantageous for providing low-cost climate change mitigation and moving toward an integrated market for renewable energy certificates. By contrasting compliance markets with voluntary renewable energy markets, I will tease apart the synergies and inconsistencies between them.

### **Innovative contribution to interdisciplinary work on the environment**

This project strategically integrates several traditionally separate areas of research: technology diffusion and deployment; analysis of energy and environmental policy; comparative analysis of states and identification of state differences, as well as private governance analysis. This integration will contribute to theory development in each of these areas by providing empirical evidence to support new theory about state-level influences on shifting to more sustainable technologies. The unique and strategic integration of traditionally separate areas of research will enhance and encourage future opportunities for cross-disciplinary research.

Practically, this research will provide insights useful to both public and private actors involved in the deployment and diffusion of renewable energy technologies for climate

change mitigation. Policy design and instrument choice determine cost-benefits of environmental policies (Goulder & Parry, 2008) making deeper knowledge of market functioning urgent. It expands the conceptualization of efficient REC markets to include interactions with other environmental commodity markets, both voluntary and compliance.

## **Work plan**

June:

- Collect information on state renewable energy policies from the Database for State Incentives for Renewable Energy (DSIRE, 2008) and state legislative texts

July:

- Develop structured interview guideline
- Set up interviews

August/September:

- Conduct interviews

October:

- Transcribe interviews

November:

- Systematically code interviews and analyze data

December:

- Write thesis chapter, prepare article for submission to Environmental Science and Policy Journal

## **Biography**

Miriam Fischlein is a Ph.D. candidate in Natural Resource Science and Management at the University of Minnesota, with a minor in business administration. Her research focuses on private environmental governance and sustainable energy, as well as the intersection between governmental regulation and business sustainability practices. She has worked with professors in several departments across the university, including the Bioproducts and Bioengineering Department (Timothy M. Smith, Sangwon Suh), the Humphrey Institute for Public Policy (Elizabeth J. Wilson), and the Carlson School of Management (Alfred A. Marcus).

Miriam holds a joint international degree in Social Sciences from the University of Stuttgart, Germany and the Institute of Political Science in Bordeaux, France. She is a recipient of the University of Minnesota Pawek Graduate Fellowship 2006-2008, and was a National Merit Scholar during her undergraduate studies in Germany. Miriam has co-published an article in Energy Policy and has presented her work at the American Public Policy Association Annual Meeting and the European Academy for Business and Society. Recently, she had a publication accepted at the Academy of Management

Annual Meeting 2009. She has been a co-instructor for ESPM 3604: Environmental Management Systems and Strategy.

## References

- Berry, D. (2002). The market for tradable renewable energy credits. *Ecological Economics*, 42(3), 369.
- Bird, L. & Lokey, E. (2007): Interaction of Compliance and Voluntary Renewable Energy Markets. Technical Report NREL/ TP-670-42096, October 2007. National Renewable Energy Laboratory: Golden, CO
- Chupka, M. W. (2003). Designing effective renewable markets. *Electricity Journal*, 16(4), 46.
- DSIRE, 2008. Database for State Incentives for Renewables and Efficiency. North Carolina Solar Center, NC State University: Raleigh, NC. Available at <http://www.dsireusa.org>
- Gillenwater, M. (2008a). Redefining RECs—Part 1: Untangling attributes and offsets. *Energy Policy*, 36(6), 2109-2119.
- Gillenwater, M. (2008b). Redefining RECs—Part 2: Untangling certificates and emission markets. *Energy Policy*, 36(6), 2120-2129.
- Goulder, L. H., & Parry, I. W. H. (2008): Instrument Choice in Environmental Policy *Review of Environmental Economics and Policy*, 2: 152-174
- Holt, E. A. and Wisner, R. H. (2007) The Treatment of Renewable Energy Certificates, Emissions Allowances, and Green Power Programs in State Renewables Portfolio Standards. Report LBNL-62574. Berkeley, CA: Ernest Orlando Lawrence Berkeley National Laboratory
- Mozumder, P., & Marathe, A. (2004). Gains from an integrated market for tradable renewable energy credits. *Ecological Economics*, 49(3), 259-272.
- Pacala, S., and R. Socolow. (2004). Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies. *Science* 305, no. 5686:968-972.
- Rabe, B.G. (2008). States on steroids: The intergovernmental odyssey of American climate policy. *Review of Policy Research* 25(2), 105-128