## Deepak Rajagopal


**Contact Information**

Assistant Professor
Institute of Environment and Sustainability
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**Research Expertise**

Environmental economics and policy, Lifecycle analysis of energy systems, Energy markets and policy, Energy and Sustainable Development, Economics of Food and Agriculture, Integrated assessment of technology, markets and policy

**Education**

Ph.D, Energy and Resources, University of California, Berkeley, July 2009
M.S., Agricultural and Resource Economics, Univ of California, Berkeley, July 2009
M.S., Mechanical Engineering, University of Maryland, College Park, May 2001
B.Tech., Mech. Engineering, Indian Inst. of Technology, Madras, India, May 1999

**Professional Experience**

Institute of Environment, University of California, Los Angeles
*Assistant Professor* July 2010 to present

Energy Biosciences Institute, University of California, Berkeley
*Post-doctoral scholar* August 2009 to June 2010

United Technologies Research Center, East Hartford, Connecticut
*Structural integrity and Reliability Engineer* August 2001 to May 2004

**Refereed Publications**

D. Rajagopal, G. Hochman and D. Zilberman (2011): Indirect fuel use change and the environmental impact of biofuel policies. *Energy policy* 39 228-233

D. Zilberman, G. Hochman, and D. Rajagopal (2011). Indirect Land Use Change: A Second Best Solution to a First Class Problem. *Agbioforum* 13(4), 382-390

D. Zilberman, G. Hochman, and D. Rajagopal (2011). On the inclusion of Indirect Land Use in Biofuel Regulations *Illinois Law Review* 2 413-434

G. Hochman, D. Rajagopal, G. Timilsina and D. Zilberman (2011). The Role of Inventory Adjustments in Quantifying Factors Causing Food Price Inflation *World Bank Policy Research Working Paper # 5744 http://econ.worldbank.org/docsearch*

G. Hochman, D. Rajagopal and D. Zilberman (2011). The Effect of Biofuels on International Oil Markets. *Applied Economic Perspectives and Policy* vol. 33 (3), 402-427

G. Hochman, D. Rajagopal and D. Zilberman (2010). The Effect of Biofuels on Crude Oil Markets. *AgBioForum* vol. 13 (2), 112-118

G. Hochman, D. Rajagopal and D. Zilberman (2010). Are Biofuels the Culprit? OPEC, Food, and Fuel. *American Economic Review*, 100(2): 183 - 187.

D. Rajagopal, S.Sexton, G. Hochman and D. Zilberman (2009). Recent developments in renewable technologies: R&D.investment in advanced biofuels. *Annual Review of Resource Economics*, vol. 1, 1.11.24

D. Rajagopal, S.Sexton, G. Hochman, D. Roland-Holst, and D. Zilberman (2009). Model estimates of food-versus-biofuel trade-off, *California Agriculture*, vol. 63(4), 199-201

D. Rajagopal and D. Zilberman (2008). Environmental, economic and policy aspects of biofuels. *Foundations and Trends in Microeconomics*, 4(5): 353-469 and *World Bank Policy Research Working Paper* No. 4341

D. Rajagopal (2008). Implications of India's biofuel policies for food, water and the poor. *Water Policy*, vol. 10(S1): 95-106

S Sexton, D. Zilberman, D. Rajagopal, and G. Hochman (2008). The role of biotechnology in a sustainable biofuel future. *AgBioForum*, 12(1): 1-11

D. Rajagopal, S.Sexton, G. Hochman, D. Roland-Holst, and D. Zilberman (2007). Challenge of biofuel: filling the tank without emptying the stomach. *Environmental Research Letters*, 2(2):1-9

S. K. Gupta and D. Rajagopal (2002). Forming part families for generating shared press-brake setups. *Journal of Manufacturing Systems*, 21(5):329-349

## Book chapters, Reports and Conference proceedings

D. Zilberman, D. Rajagopal and G. Hochman (2012): Economists perspective on biofuels. Chapter in forthcoming book *Perspectives on Biofuels: Potential Benefits and Possible Pitfalls*, American Chemical Society Symposium Series

D. Rajagopal (2011): The Economics of Biofuel Policies. Editorial in the journal *Biofuels* 2(6)

G. Hochman, D. Rajagopal and D. Zilberman (2011) Biofuels and Climate Change in *Handbook On Climate Change And Agriculture* Edited by Robert Mendelsohn and Ariel Dinar, Edward Elgar Publishing

D. Zilberman, D. Rajagopal, S. Sexton, G. Hochman, and T. Serra (2011): The Economics of Biofuels, Food and the Environment, in the book *The Economics of Alternative Energy Sources and Globalization*, Edited by Andrew Schmitz, Norbert Wilson, Charles Moss, and David Zilberman. Published by Bentham Books, Oak Park, IL, eISBN: 978-1-60805-233-2

Rajagopal, D., G. Hochman, D. Zilberman, and D. Kammen. Emissions and Energy Security: Comparing Clean Fuel Mandates and Fuel Carbon Standards. $4^{th}$ *World Congress of Environmental and Resource Economists*, Universit du Qubec, Montreal. June 28th -July 2nd, 2010.

D. Rajagopal, G. Hochman and D. Zilberman (2010). Lifecycle based regulation of fuels: A Rube Goldberg Contraption of Climate policy *USAEE Dialogue* The Official Publication of the United States Association for Energy Economics, Vol. 18, No. 1, March 2010

D. Rajagopal, G. Hochman and D. Zilberman (2009). A simple frame-work for regulation of biofuels. Chapter in *Handbook of bioenergy economics and policy (series: natural resource management and policy)*

M Khanna, G. Hochman, D. Rajagopal, S Sexton and David Zilberman (2009). Sustainability of food, energy and environment with biofuels. *CAB Reviews: Perspectives*

*in Agriculture, Veterinary Science, Nutrition and Natural Resources 2009*, 4(28)

D. Rajagopal and D. Zilberman (2008).The Use of Environmental Life-Cycle Analysis for Evaluating Biofuels. *Agricultural and Resource Economics Update* published by Giannini Foundation of Agricultural Economics,11(3)

D. Rajagopal and D. Zilberman (2008). Environmental Lifecycle Assessment for Policy Decision-Making and Analysis *Proceedings of a conference on Lifecycle Carbon Footprint of Biofuels* Edited by Joe L. Outlaw and David P. Ernstes January 29, 2008, Miami Beach, Florida .

S. Sexton, D. Rajagopal, D. Zilberman, and G. Hochman (2008) Food versus Fuel: How biofuels make food more costly and gasoline cheaper. *Agricultural and Resource Economics Update* published by Giannini Foundation of Agricultural Economics, 12(1).

S. Sexton, D. Rajagopal, D. Zilberman, and D. W. Roland-Holst (2007) The Intersection of Energy and Agriculture: Implications of Rising Demand for Biofuel and the Search for the Next Generation. *Agricultural and Resource Economics Update* published by Giannini Foundation of Agricultural Economics, 10(5).

## Papers in progress

D. Rajagopal and D. Birur: Energy use change effect mitigates land use change effect and lowers carbon payback period of biofuels. *Submitted to Energy Policy 12/2011*

D. Rajagopal and D. Zilberman: On environmental lifecycle assessment for policy selection. *In preparation for resubmission to Ecological Economics*

W. Buermann, A. Moorthy, D. Rajagopal: Impact of climate trends on crop yields in India. *In preparation for submission to Environmental Research Letters*

D. Rajagopal. Lifecycle environmental benets of accelerated product retirement: Evidence from Cash-for-Clunkers. *In preparation for submission to Environmental Science and Technology*

D. Rajagopal, G. Hochman, and D. Zilberman. Multi-criteria comparison of fuel policies: Renewable fuel standards, clean fuel standards and fuel GHG tax. *In preparation for resubmission to The Energy Journal*

G. Hochman, D. Rajagopal, and D. Zilberman. A Technological Response to Environmental Policy: From Putty-Clay to Putty-Doh. In review *Environmental and Resource Economics*

D. Rajagopal, G. Hochman, D. Zilberman. Regulation of GHG emissions from transportation fuels: Emission quota versus emission intensity standard. *Institute of Environment and Sustainability Working Paper Series* No. 3

Brandt, A.R., and D. Rajagopal. Dynamics of transition from conventional crude oil: Implications for energy security and environment.

## Invitations workshops and seminars

Speaker on the panel *Sustainable Energy - The Path to our Energy Future* held at the German American Energy Forum, 555 Pennsylvannia Avenue, Washington, DC, October 14th, 2010

Workshop on *Biofuels: Environmental Consequences and Interactions with Changing*

*LandUse* organized by the German National Committee for Scientific Committee on Problems of the Environment (SCOPE) at Gummersbach, Germany, September $22^th$ to $25^th$ 2008

Food and Agriculture Organization, 1st FAO BEFSCI technical consultation on Criteria and Indicators on Sustainable Bioenergy Production that Safeguards Food Security, to be held at FAO headquarters in Rome, Italy between November 2nd -4th, 2009

California State University, Sacramento, Ethical implications of the interconnection between food, energy and development policies, at the Ethics of Food symposium to be held on November 9-10th, 2009.

Lawrence Berkeley National Laboratory, Berkeley, Economics of lifecycle analysis and greenhouse gas regulation of fuels, Seminar of the Energy and Environmental Technologies Division, May 28th, 2009.

## Conference Presentations

Prices vs quantities in the context of Lifecycle assessment based regulations. Inaugural Summer Conference of *Association of Environmental and Resource Economists* at Seattle, June 8-10 2011

Domestic policies for global externalities: Technology mandates versus performance standards in the transportation sector. *4th World Congress of Environmental and Resource Economists held at Universit du Qubec Montral*, June 28-July 2nd, 2010.

Cleaning up transportation: Clean fuel mandate versus emission standard. Presented at *$32^th$ International Association of Energy Economics conference* at San Francisco, June 2009

A simple framework for regulation of greenhouse gases from biofuels. Presented at *$28^th$ USAEE/IAEE North American Conference* at New Orleans, Louisiana, December 2008

Regulation of greenhouse gas emissions from biofuels. Presented at *Farm Foundation and USDA Conference on Transition to a bioeconomy: Environment and Rural Development Impacts* at St. Louis, Missouri, October 15-16 2008

Prices, Policies and Environmental Lifecycle Analysis of Energy *AERE session of the 2008 Joint Annual Meeting American Association of Agricultural Economics and Americal Council on Consumer Interests* at Orlando, Florida, July 2008

Rethinking current strategies for biofuel production in India. *International Conference on Linkages in Water and Energy in Developing Countries.* Conference organized by IWMI, FAO and ICRISAT at Hyderabad, India January 2007

## Teaching Experience

**University of California,Los Angeles**

*Lecturer* Spring 2011
Env157, *Energy Environment and Development.*
https://ccle.ucla.edu/course/view/11S-ENVIRON157-1

**University of California,Berkeley**

*Lecturer* Spring 2010
Environmental Economics and Policy EEP101/Econ125, *Environmental Economics.*

*Lecturer* Fall 2009, Fall 2008, Fall 2007

Plant and Microbial Biology 10, *Plant Agricultural and Society.*

## Consulting Experience

**The World Bank, Washington DC** March 2009 to March 2010
Quantifying the role of biofuels in the food crisis of 2008. Contact: Govinda Timilsina, Sr. Research Economist (Climate Change and Clean Energy), Development Research Group, The World Bank

**Natural Resources Defense Council**, New York June 2009 to September 2009
Critical assessment of US Environmental Protection Agencys proposed rule-making for Renewable Fuel Standard.

**The World Bank, Washington DC** Feb 2007 to May 2007
Critical review of the literature of the environmental, economic and policy literature on biofuel.

**US Agency for International Development, Washington DC** February 2009
Review of Biofuels in South and South-east Asia.

## Professional Service

- Referee: Agricultural Economics, European Review of Agricultural Economics, Energy Policy, Environmental Research Letters, Environmental Science and Technology, Agriculture and Human Values, World Development, Resources, Conservation and Recycling, Economic Research Service Economic Research Report Series, Biofuels, Bioproducts and Biorefining
- Member: International Association of Energy Economics, American Association of Agricultural Economics, Association of Environmental and Resource Economists

## Honors and Awards

- Student Paper Award for paper "Greenhouse gas regulation of transportation fuels: Emission quota versus intensity standards," $32^{\text{th}}$ Annual Conference of the International Association for Energy Economics (June 2009).
- United Nations Industrial Development Organization and University of California Berkeley, Management of Technology Program Fellowship, Haas School of Business (2005)
- Outstanding Teaching Assistant Award for 1999-2000 by the Center for Teaching Excellence, University of Maryland
- Outstanding Achievement Award for the project on Modeling and Analysis of Cooling, Heating and Power (CHP) Systems for Buildings, United Technologies Research Center (2003)
- Outstanding Achievement Award for the project Integrated Total Aircraft Power Systems Modeling and Analysis, United Technologies Research Center (2002)