

IP643 Climate Change and Energy Policy

Spring 2008, 4 Credits
Fridays 1:00-2:50 PM
Classroom B106
Conference IP643-SP08

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Course Description

This course provides an overview of climate change policy at the international, domestic, and local levels, with a focus on the close relationship between climate change and energy use. Topics include: climate science basics; climate change impacts and adaptation; climate policy mechanisms including regulation, subsidies, taxes, and emissions trading; history of the Kyoto Protocol, E.U. Emissions Trading System, and U.S. climate policy; climate equity and the rights of developing countries; and the role of different energy technologies in generating and reducing greenhouse gas emissions. Special emphasis will be given to the current status of climate and energy policy in California, and the challenges facing the state as it aspires to world leadership in “clean technology” for transportation and electricity generation.

Prerequisites

There are no prerequisites for this course, but prior coursework in energy, economics, and environmental science is helpful, as the course will include some technical and quantitative analysis.

Lectures and Assignments

Classes will consist of weekly topical lectures and discussion of readings. Students will be evaluated on the basis of a semester research project, written homework, and class participation including oral summaries of assigned readings.

Evaluation

Readings and Class Participation:	20%
Written Assignments:	20%
Semester Project:	60%

Semester Project:

The semester project will consist of a 3,000-5,000 word report plus an oral presentation. Students will develop a topic in consultation with the instructor, including presentation of project ideas on February 22 and submission of a one-page proposal on February 29.

Office Hours

Fridays 3:00-5:00, Room M118 (other times and locations by prior arrangement).

Required Texts

Andrew E. Dessler and Edward A. Parson, *The Science and Politics of Global Climate Change: A Guide to the Debate*, Cambridge: Cambridge University Press, 2006 (paperback, 200 pages, available on Amazon for \$33.67)

Vaclav Smil, *Energy: A Beginner's Guide*, Oxford: Oneworld Publications, 2006 (paperback, 192 pages, available on Amazon for \$11.21)

Lecture Outline, Readings, and Assignments

(Subject to change – if in doubt, ask the instructor!)

January 25: Introduction. Energy and Society.

Topics: Course overview and requirements. Introduction to energy analysis.

Reading Assignment Due: None

Written Assignment Due: None

Discussion Assignment Due: None

February 1: Energy and Greenhouse Gas Emissions.

Topics: Overview of U.S. and global energy system and its role in causing, mitigating, and adapting to climate change.

Reading Assignment Due:

- Smil, 1-53
- John P. Holdren, “The Energy Innovation Imperative: Addressing Oil Dependence, Climate Change, and Other 21st Century Energy Challenges,” *Innovations*, Spring 2006, 3-23.

Written Assignment Due:

- None, but strongly recommended that students attempt all problems in HW 1 by this day so that they can raise questions during office hours.

Discussion Assignment Due: None

February 8: Climate Science. Climate Change Impacts.

Guest Lecturer: Dr. Margaret Torn, Program Head, Climate Science and Carbon Management, Earth Science Division, Lawrence Berkeley National Laboratory

Topics: Overview of climate change science and climate change impacts.

Reading Assignment Due:

- Dessler, 47-89 (+ skim Dessler 1-46)
- Intergovernmental Panel on Climate Change (IPCC), *Fourth Assessment Report: Climate Change 2007, Working Group I Report: The Physical Science Basis*, Summary for Policy Makers (read), Technical Summary (skim). <http://www.ipcc.ch/ipccreports/ar4-wg1.htm>
- IPCC, *Fourth Assessment Report: Climate Change 2007, Working Group II Report: Impacts, Adaptation, and Vulnerability*, Summary for Policy Makers (read), Technical Summary (skim). <http://www.ipcc.ch/ipccreports/ar4-wg2.htm>

- *OPTIONAL READING:* American Institute of Physics. *Climate Change: Discovery of Global Warming.* www.aip.org/history/climate

Written Assignment Due:

- Homework 1
- Strongly recommended that students attempt all problems in HW 2 by this day so that they can raise questions during office hours.

Discussion Assignment Due: None

February 15: Low Carbon Energy Technology.

Topics: Technologies for climate change mitigation, with a focus on the electric power and transportation sectors. Renewable energy, nuclear power, carbon capture and storage. Low emissions vehicles.

Reading Assignment Due:

- Smil, 85-126 (+ skim 54-84)
- IPCC, *Fourth Assessment Report: Climate Change 2007, Working Group III Report: Mitigation of Climate Change, Summary for Policy Makers* (read), Technical Summary (skim). <http://www.ipcc.ch/ipccreports/ar4-wg3.htm>

Written Assignment Due:

- Homework 2
- Strongly recommended that students attempt all problems in HW 3 by this day so that they can raise questions during office hours.

Discussion Assignment Due:

- Discussion group A policy news report.

February 22: Emissions and Mitigation Scenarios.

Topics: Estimating future emissions and mitigation costs. Developing emission scenarios from IPAT growth forecasts. Wedges game.

Reading Assignment Due:

- Smil, 127-176
- Dessler, 90-127
- David Keith, "Geoengineering," *Nature*, 409 (January 2001) 420
- Martin Hoffert et al., "Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet," *Science*, 298 (November 2002) 981-987
- Steven Pacala and Robert Socolow, "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," *Science*, August 13, 2004, 968-972 (+ skim "Supporting Material")
- Stabilization Wedges Game web site http://www.princeton.edu/wedges/game_materials/ (skim sufficiently to see how the game is played)

Written Assignment Due:

- Homework 3

Discussion Assignment Due:

- Discussion group B policy news report.
- Prepare to play emissions scenario and stabilization wedges games in class.

February 29: California Climate and Energy Policy.

Topics: California's climate change and energy policies – history and current challenges. Origins and implementation of AB32.

Reading Assignment Due:

- State of California, Assembly Bill 32, Global Warming Solutions Act of 2006
- Governor of California, Executive Order S-03-05
- State of California, Assembly Bill 1493, "Pavley Bill" on Vehicular Emissions
- State of California, Senate Bill 1368, Greenhouse Gas Performance Standard in Electricity Generation
- California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the California Legislature*, Executive Summary, March 2006
- Margo Thorning, "California Climate Change Policy: Is AB 32 a Cost-Effective Approach?," American Council for Capital Formation, June 15, 2006
- Michael Hanemann, "Review of Economic Arguments Against AB32," California Climate Change Center, University of California, Berkeley, August 2006
- Jad Mouawad and Jeremy W. Peters, "California Plan to Cut Gases Splits Industry," *New York Times*, September 1, 2006
- Alison Bailie, Bill Dougherty, Charlie Heaps, Michael Lazarus, *Turning the Corner on Global Warming Emissions: An Analysis of Ten Strategies for California, Oregon, and Washington*, Tellus Institute, July 28, 2004 (skim)
- David Roland-Holst, "Economic Growth and Greenhouse Gas Mitigation in California," UC Berkeley conference paper, August 2006 (Read the Executive Summary pp. 2-4 and Section 4 pp. 22-31)

Written Assignment Due: Description of two ideas for semester project. Each description should be a single brief paragraph in length.

Discussion Assignment Due:

- Discussion Group C and D, summary of today's readings.
- Each student will have one minute total to present their two project ideas.

March 7: Kyoto Protocol.

Topics: History and policy mechanisms of the Kyoto Protocol and the U.N. Framework Convention on Climate Change. The Clean Development Mechanism. Plans and negotiations for the international framework to replace the Kyoto Protocol after the end of the first commitment period in 2012.

Reading Assignment Due:

- United Nations, *United Nations Framework Convention On Climate Change*, New York: United Nations, 1992
- United Nations, *Kyoto Protocol to the United Nations Framework Convention On Climate Change*, New York: United Nations, 1998
- J. W. Anderson, "How Climate Change Policy Developed: A Short History," Resources for the Future Backgrounder, November 2005
- Michael Wara, "Is the Global Carbon Market Working?" *Nature* 445 (8 February 2007)
- Ruth Greenspan Bell, "The Kyoto Placebo," *Issues in Science and Technology Online*, Winter 2006 http://www.issues.org/22.2/p_bell.html

- *OPTIONAL READING*: Bruce P. Chadwick, “Transaction Costs and the Clean Development Mechanism,” *Natural Resources Forum*, 30 (2006) 256–271

Written Assignment Due:

- Submit one page proposal for semester project. Each student should arrange a 10-minute discussion with instructor to discuss and finalize research plan.

Discussion Assignment Due:

- Discussion Group E summary of today’s readings.

March 14: Spring Break

March 21: Climate Change Economics.

Topics: Economic impacts of climate change and who is affected. The costs of climate mitigation and adaptation in different sectors and who pays. The Stern Review. Long-term discount rates, geographic and temporal equity.

Reading Assignment Due:

- Nicholas Stern, *The Economics of Climate Change: The Stern Review*, Cambridge: Cambridge University Press, 2007 (selected chapters – TBD) http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm
- Frank Ackerman, “Debating Climate Economics: The Stern Review vs. Its Critics,” Report to Friends of the Earth-UK, July 2007
- William Nordhaus, “Critical Assumptions in the Stern Review on Climate Change,” *Science*, 317 (July 13, 2007) 201-202
- Nicholas Stern and Chris Taylor, “Climate Change: Risk, Ethics, and the Stern Review,” *Science*, 317 (July 13, 2007) 203-204
- *OPTIONAL READING*: Partha Dasgupta, “Comments on the Stern Review's Economics of Climate Change,” University of Cambridge, Presentation to the Royal Society, November 11, 2006
- *OPTIONAL READING*: Richard S.J. Tol, “The Stern Review of the Economics of Climate Change: A Comment,” Economic and Social Research Institute Working Paper, October 30, 2006

Written Assignment Due: None.

- *Discussion Assignment Due*: Discussion Group A summary of today’s readings.

March 28: Policies and Measures. Cap and Trade.

Topics: The theory and practice of regulatory and market mechanisms for climate mitigations, including direct regulation, carbon taxes, emissions trading, offsets. Cap and trade architecture and key variables. The European Trading System.

Reading Assignment Due:

- Dessler, 128-179
- Larry Lohmann, “Carbon Trading: A Critical Conversation on Climate Change, Privatisation, and Power,” *Development Dialogue*, 48 (September 2006)

- Raymond Kopp, “An Overview of the European Union Emissions Trading Scheme,” Resources for the Future, Congressional Testimony, March 26, 2007
<http://www.rff.org/rff/News/Releases/2007Releases/BurtrawKoppTestimony3-29-07.cfm>
- *OPTIONAL READING:* Holmes Hummel, *An Introduction to Cap and Trade Using Musical Chairs: An Illustration of Managed Scarcity*. Slide presentation. November 2007.
Written Assignment Due: None
- *Discussion Assignment Due:* Discussion Group B summary of today’s readings.

April 4: Implementing AB32 in California’s Electricity Sector

Topics: Details of implementing California’s Global Warming Solutions Act, including sectoral modeling in electricity and transportation.

Tentative Plan: The class will attend in person or by webcast (TBD) the California Air Resources Board Scenarios Workshop. This workshop is a key event in the development of the AB32 Scoping Plan, which will establish sectoral emission reduction targets and timelines and cap and trade architecture.

Reading Assignment Due:

- Readings TBD on the AB32 Scoping Plan, Joint Agency Process, sectoral modeling, point of regulation, entity specific allocations, flexibility mechanisms.

Written Assignment Due: None. If the class attends workshop, students should take notes on the proceedings in order to prepare a policy memo on a workshop key aspect for next week’s written assignment.

Discussion Assignment Due: TBD, depending on plan.

April 11: U.S. Climate Policy. Regional/Local Initiatives.

Topics: The history and politics of U.S. climate change policy at the federal, state, and local levels, including current proposed legislation such as the Lieberman-Warner Bill. Regional/local climate initiatives including the Western Climate Initiative, the Regional Greenhouse Gas Initiative, and Cities for Climate Protection.

Reading Assignment Due:

- Toshi H. Arimura, Dallas Burtraw, Alan Krupnick, and Karen Palmer, “U.S. Climate Policy Developments,” RFF DP 07-45, October 2007
- McCright and Dunlap, “Defeating Kyoto: The conservative movement’s impact on U.S. climate change policy,” *Social Problems* 50 (2003) 348-373.
- United States Senate, 105th Congress, Byrd-Hagel Resolution,
<http://www.nationalcenter.org/KyotoSenate.html>

Written Assignment Due: Each discussion group will write a one-page policy memo analyzing one key aspect (TBD) of the CARB Scenarios Workshop.

Discussion Assignment Due: Discussion Group C summary of today’s readings.

April 18: China.

Topics: China’s economic development, energy use, and greenhouse gas emissions from a historical and international policy perspective. Recent energy and climate change policy developments in China. China’s energy and emissions relationship with the U.S.

Reading Assignment Due: TBD

- Jianguo Liu and Jared Diamond, “China’s environment in a globalizing world: How China and the rest of the world affect each other,” *Nature*, 435 (June 30, 2005) 1179-1186
- Tao Wang and Jim Watson, *Who Owns China’s Carbon Emissions?* Tyndall Centre for Climate Research, Briefing Note No. 23, October 2007
- Elizabeth Economy, “The River Runs Black: The Environmental Challenge to China’s Future,” Chapter 6. Cornell University Press, 2004.
- Jonathan Sinton, et al. “Evaluation of China’s Energy Strategy Options.” LBNL, May 2005 <http://china.lbl.gov/publications/nesp.pdf>
- Pan Yue, interviewed by Zhou Jigang. “The rich consume and the poor suffer the pollution,” *China Dialogue*, October 27, 2006. <http://www.chinadialogue.net/>
- Li Jiao. “World’s Biggest Greenhouse Gas Deal Takes Effect in Win-Win Situation for China, Industrialized Nations.” October 3, 2006. <http://www.worldwatch.org/node/4634>
- Energy Foundation, *China Clean Energy Fact Sheet*, December 2007 <http://www.efchina.org/FHome.do>

Written Assignment Due: None.

Discussion Assignment Due: Discussion Group D summary of today’s readings.

April 25: Climate Equity. Climate Security.

Topics: The impacts of climate change on developing countries and the world’s poor, their rights and obligations in an international climate protection regime. Security issues related to climate impacts. The links among geography, demographics, vulnerability, impacts, adaptation costs, equitable burden-sharing arrangements, and international security.

Reading Assignment Due:

- United Nations Development Program, *Fighting Climate Change: Human Solidarity in a Divided World*, Human Development Report 2007/2008, New York: United Nations, 2007 (Read Overview, skim the rest)
- Poverty-Environment Partnership, *Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation*, United Nations Development Program, 2003
- Paul Baer, Tom Athanasiou, and Sivan Kartha, *The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework*, Berlin: Heinrich Böll Foundation, November 2007 <http://www.ecoequity.org/docs/TheGDRsFramework.pdf> (read Executive Summary, skim the rest)
- CNA Corporation, *National Security and the Threat of Climate Change*, 2007
- *OPTIONAL READING:* Peter Schwartz and Doug Randall, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, Global Business Network, February 2004 <http://www.gbn.com/ArticleDisplayServlet.srv?aid=26231>

Written Assignment Due: None

Discussion Assignment Due:

- Discussion Group E summary of today’s readings.

May 2: Semester Project Presentations. (3 hour class – 1:00-4:00)

Students present the results of their semester projects to the class. 15 minutes per person including time for questions and answers.

May 9: Semester Project Presentations. Course Wrap-Up. (3 hour class – 1:00-4:00)

Students present the results of their semester projects to the class. 15 minutes per person including time for questions and answers. Final reflections on climate change and energy policy.

Energy and Climate Web Sites**Government and UN agencies**

- US Energy Information Administration, (<http://www.eia.doe.gov/>)
- International Energy Agency, <http://www.iea.org/>
- Intergovernmental Panel on Climate Change (IPCC), <http://www.ipcc.ch/>
- UNFCCC Secretariat, <http://unfccc.int>
- OECD Environment Directorate, Climate Change, <http://www.oecd.org/>

Local/regional climate initiatives

- California Climate Change Portal, <http://www.climatechange.ca.gov/>
- Western Climate Initiative, <http://www.westernclimateinitiative.org/>
- Regional Greenhouse Gas Initiative, <http://www.rggi.org/>

Climate and energy policy reporting

- New York Times, energy series, <http://www.nytimes.com/ref/science/earth/energy.html>
- BBC climate portal, http://news.bbc.co.uk/2/hi/science/nature/portal/climate_change/
- Earthwire climate, <http://www.earthwire.org/climate/>
- World Business Council for Sustainable Development [Energy & Climate](#) Newsletter,
- Point Carbon North America, biweekly newsletter, <http://www.pointcarbon.com>
- Grist, <http://grist.org/topic/climate>

Science, policy research and advocacy

- Jim Hansen's home page, <http://www.columbia.edu/%7Ejeh1/>
- Real Climate, <http://www.realclimate.org/>
- American Meteorological Society, <http://www.climatepolicy.org/>
- Climate Action Network, <http://www.climateactionnetwork.org/>
- Pew Center on Climate Change, www.pewclimate.org
- World Resources Institute, www.wri.org
- Resources For the Future, www.rff.org
- Ecoequity, www.ecoequity.org
- Center for Science and Environment (Indian NGO), <http://www.cseindia.org/>
- Energy Foundation, China Sustainable Energy Program, <http://www.efchina.org/FHome.do>
- National Commission on Energy Policy, <http://www.energycommission.org/>
- Presidential Climate Action Plan, <http://www.climateactionproject.com/>