

Presentations for the accelerated
Climate Policy Design Pro-Series

available online:

<http://www.holmeshummel.net/ClimatePolicyDesign>

CLIMATE POLICY DESIGN

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**Syllabus for ER291
Energy Resources Group
UC-Berkeley**

Dr. Hummel welcomes feedback from those using the collection below:
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Overview: In order to stabilize greenhouse gas concentrations, a wide variety of public policies are needed to drive a rapid and large-scale energy technology transition. This course introduces essential design concepts in contemporary climate policy deliberations and the policy-relevant technology research on which the debates depend. Topics covered in the course will include emission targets, strategies for technology innovation and transformation, price-based mechanisms such as cap-and-trade and carbon taxes, complementary non-price policies, and concepts of justice that frame the political negotiations.

SYLLABUS, WEEK BY WEEK:

1. [Framing the Challenge: Science, Economics, Politics](#)
2. [Targets, Time Tables, and Technology](#)
3. [Politics of a Durable Deal: Justice as Realism](#)
4. [Essential Climate Policy Design Elements: Case of California](#)
5. [Taking Action Without Addressing the GHG Externality](#)
6. [Design Considerations for Establishing a Market-Based Price to Address an Externality](#)
7. [Negotiating Cost Containment and Environmental Effectiveness under a Cap-and-Trade Regime](#)
8. [Design Elements for a Pollution Permit Market](#)
9. [Midterm Exam and Project Preparation](#)
10. [Policy Options and Political Considerations for Spending Public Funds](#)
11. [State & Local Initiatives](#)

12. [TBD](#)
13. [Integration Challenges Across State, Federal, and International Policies](#)
14. [Architecting an Apollo-Scale Response to Climate Change](#)
15. [International Climate Negotiations](#)
16. [Final Projects Due](#)

INTRODUCTION

Climate policy design involves interdisciplinary problem-solving to address concerns about climate change impacts, economic development, technological feasibility, political mobilization bias, international competitiveness, and climate justice. Taught through the perspective of a policy analyst tasked with designing various aspects of a comprehensive response to climate change, this course will draw on literature that reflects the latest thought-leadership in the field.

This course will treat only briefly those topics for which UC-Berkeley offers full courses: climate science (GEOG142), mitigation technologies (CIVENG107), adaptation policy (ER291-002), legal issues (LAW272.2), and economic analysis of climate change (ENVECON C175).

Climate policy design dilemmas persist at the international, federal, state, local and corporate levels.

- How do these policy negotiations relate to each other?
- How are the terms of debate framed?
- Who decides – and how?
- From a technology perspective, what are the bottom lines and open questions in high-stakes climate policy negotiations?
- What do scenarios for climate stabilization imply about changes in energy technology and policy within the career span of someone entering the field today?
- What types of policy-relevant technical research are needed to design key and controversial measures under deliberation?

With a focus on U.S. climate policy development and links to both state and international negotiations, this course on Climate Policy Design will draw heavily on contemporary proceedings, preparing graduates for professional engagement and providing ample opportunity to explore timely research topics. Students will gain fluency in the field by working with defining documents for landmark policy designs such as:

- California's Global Warming Solution Act, AB32
- Lieberman-Warner Climate Security Act, S2191
- UNFCCC Bali Roadmap and Action Plan
- European Union Emissions Trading System
- Regional Greenhouse Gas Initiative
- Western Climate Initiative

Week 1

FRAMING THE CHALLENGE: SCIENCE, ECONOMICS, POLITICS

TOPICS

- Intensifying climate impacts and humanitarian crises
- More emphatic statements from science and scientists
- Supreme Court rulings requiring policy action
- State and local policy developments
- UNFCCC policy negotiations
- Emerging security concerns
- Confluence of energy price crisis and clean energy technology surge
- Global trade and competitiveness concerns
- Business formations: BELC + C3 + US CAP vs. USCC + ACCCE +API
- Popular formations: 1Sky + CAN + Energy Action vs. ABEC and ...?
- Ushering a clean energy technology revolution through multiple levels of governance
- Climate policies as risk management

Management of climate risks includes managing the risk that a climate policy will not be effective.

REFERENCE READING – *no reading is required for first day of class; however, all are highly recommended*

Anderson (2005) [How Climate Change Policy Developed](#). Washington: RFF. 18.

IPCC Working Group 1. (2007) [Summary for Policy Makers: The Physical Basis](#). *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. 18.

IPCC Working Group 2. (2007) [Summary for Policy Makers: Impacts, Adaptation, and Vulnerability](#). *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. 16.

Lavergne, R. et al. (2007) [CO2 and Energy: France and Worldwide](#). General Directorate for Energy and Raw Materials, and Mission Climat of Caisse des Dépôts. Paris, France. 48.

Luers, et al (2006) [Our Changing Climate: Assessing the Risks to California](#). Sacramento: California Energy Commission. CEC-500-2006-077. 16.

CNA Military Advisory Board. (2007) [National Security and the Threat of Climate Change](#). CNA Corporation: Washington, DC. 35.

BACKGROUND WEB RESOURCES

- A history of climate change science www.aip.org/history/climate
- Intergovernmental Panel on Climate Change www.ipcc.ch/
- U.N. Framework Convention on Climate Change www.unfccc.int
- Pew Center for Global Climate Change www.pewcenter.org
- Resources for the Future www.weathervane.rff.org
- Center for Climate Strategies www.climatestrategies.us
- California's Climate Change Portal www.climatechange.ca.gov

Week 2

TARGETS, TIME TABLES, AND TECHNOLOGY

TOPICS

- Negotiating climate risk and concepts of “danger”: science and society
- Emissions scenarios for climate stabilization
- Crucial abstractions and assumptions in scenario modeling
- Essential technology innovation paths
- Choosing a global long-term stabilization target
- Choosing short-term emission reduction targets [U.S. context]
- Scale, speed, and stranded assets

REQUIRED READING:

IPCC. (2007) *Synthesis Report. Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. 22.

Bierbaum, R., J. Holdren, M. MacCracken, R. Ross, P. Raven. (2007) *Confronting Climate Change: Avoiding the Unmanageable and Managing the Unavoidable*. United Nations-Sigma Xi Scientific Expert Group on Climate Change. UN Foundation: Washington, DC.

[Executive Summary](#) (16 pgs)

[Full Report, Chapter on Mitigation](#): Pages 43-79

IPCC Working Group III. (2007) **Summary for Policy Makers: Mitigation of Climate Change.** *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*.

[Summary for Policy Makers](#)

[Technical Summary](#) – skim report, and read pp 87-92 with care.

Deferred: [*Explanatory note on low emissions scenarios in the IPCC Fourth Assessment Report, expected in Climatic Change.*] Not yet released from peer-review.

Krause, Bach and Koomey. (1992) “**How much fossil fuel can still be burned?**” *Energy Policy in the Greenhouse*. pp 187-208.

(Scanned for posting on internal course website)

Hansen, J. et al. (2008) [Target atmospheric CO2: Where should humanity aim?](#) Submitted to *Open Atmospheric Science Journal*, last revised June 18, 2008.

Holdren, J. (2006) “[The Energy Innovation Imperative: Addressing Oil Dependence, Climate Change, and Other 21st Century Energy Challenges](#),” *Innovations*, Spring 2006, 3-23.

Skim this as an example of one of hundreds of scenario analysis reports in the field. This happens to be one of the most thoroughly vetted multi-model studies looking at both global and U.S. scales:

Clarke, L., J. Edmonds, H. Jacoby, H. Pitcher, J. Reilly, R. Richels, 2007. [Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations](#). Sub-report 2.1A of Synthesis and Assessment

Product 2.1 by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Department of Energy, Office of Biological & Environmental Research, Washington, D.C., USA, 154pp.

REFERENCE READING:

Renewable Energy & Energy Efficiency

Hamrin J. and H. Hummel. (2007) [*Review of the Role of Renewable Energy in Global Scenarios*](#). International Energy Agency Implementing Agreement on Renewable Energy: Paris, France. 79.

Kutscher, ed. (2007) [*Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030*](#). American Solar Energy Society.

Carbon Sequestration

Intergovernmental Panel on Climate Change (2005) [*Summary for Policy Makers*](#). *IPCC Special Report on Carbon Dioxide Capture and Storage*. University of Cambridge Press.

Nuclear Power

Deutch and Moniz (2003) [*The Future of Nuclear Power*](#). MIT: Boston, MA.

Geoengineering

Crutzen (2006) **Albedo enhancement by stratospheric sulfur injections: A contribution to resolve a policy dilemma?** *Climatic Change* 77: 211-219. Plus Editorial Comments by Cicerone, Bengtsson, Kiehl, Lawrence, and McCracken: 220-242.
[Available via link through internal course website to UC-Berkeley library]

Keith (forthcoming) [*Engineering the Planet*](#). In *Climate Science and Policy*. Schneider and Mastrandrea, eds. Island Press. 1-11.

Technology Implications of Scenario Analysis

Hummel, H. (2006) [*Interpreting Global Energy and Emission Scenarios: Methods for Understanding and Communicating Policy Insights*](#). Dissertation, Interdisciplinary Program on Environment and Resources, Stanford University. 482.

Parson, E., V. Burkett, K. Fisher-Vanden, D. Keith, L. Mearns, H. Pitcher, C. Rosenzweig, M. Webster, 2007. [*Global Change Scenarios: Their Development and Use*](#). Sub-report 2.1B of Synthesis and Assessment Product 2.1 by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Department of Energy, Office of Biological & Environmental Research, Washington, D.C. USA, 106 pp.

Caldeira, K., A.K. Jain, and M.I. Hoffert, **Climate sensitivity uncertainty and the need for energy without CO₂ emission**, *Science* 299, 2052-2054, 2003. [Available through UC-Berkeley Library online.]

Socolow & Pacala (2006) [*A Plan to Keep Carbon in Check*](#). *Scientific American* 295: 50-57.

Creyts, J. et al. (2007) [*Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?*](#) McKinsey & Co: New York, NY. 107.

Week 3

POLITICS OF A DURABLE DEAL: JUSTICE AS REALISM

TOPICS

- Climate justice: integrating sufficiency, security, and sustainability
- Coping with geopolitical instability
- Common but differentiated responsibilities and capacities to address climate change
- Greenhouse Development Rights
- Environmental justice concerns raised by Californians in climate policy debates

REQUIRED READING:

United Nations. (1992) [United Nations Framework Convention on Climate Change](#). United Nations: New York, NY. 25.

Baer, et al (2000) [Equity and Greenhouse Gas Responsibility](#). *Science* 289: 2287. 1.
[or Available via link through UC-Berkeley Main Library.]

Farber, D. (2008) [Climate justice and the China fallacy](#). California Center for Environmental Law & Policy: Berkeley, CA. 6.

Gardiner (2004) **Ethics and global climate change**. *Ethics* 114: 555-600. 6.
[Available via link through UC-Berkeley Main Library.]

Baer, P., T. Athanasiou, and S. Kartha. (2008) *Greenhouse Development Rights*. Second Edition. Berlin: Heinrich Böll Foundation. [Executive Summary](#), 8.

Hoerner and Robinson. (2008) **A Climate of Change: African Americans, Global Warming, and a Just Climate Policy for the U.S.** *Environmental Justice and Climate Change Initiative*. 69.
<http://www.ejcc.org/climateofchange.pdf>

[Executive Summary](#), 6.

EJ Matters. (2008) [The California Environmental Justice Movement's Declaration Against the Use of Carbon Trading Schemes to Address Climate Change](#). 2.

United Nations Development Program. (2007) [Fighting Climate Change: Human Solidarity in a Divided World](#). Human Development Report 2007/2008, New York: United Nations. 399.

Overview, 18.

Parks and Roberts (2006) **Globalization, Vulnerability to Climate Change, and Perceived Injustice**. *Society and Natural Resources*. 19: 337-355. 18.
[Available via link through UC-Berkeley Main Library.]

Farber, D. (2008) **The Case for Climate Compensation: Justice for Climate Change Victims in a Complex World**. *Utah Law Review* 2008:2. 377-413.
[Available through course website via link to UC-Berkeley Library]

Week 4

ESSENTIAL CLIMATE POLICY DESIGN ELEMENTS: CASE OF CALIFORNIA

TOPICS

- Conceptually addressing entire categories of market failures underlying GHG emissions
- Monitoring, reporting, and verification
- Mandatory emissions cap
- Protocol for updating emissions cap
- “Truth in pricing” – including the cost of *avoiding* GHG emissions in the cost of *not avoiding* them
- Addressing monopoly power – either by changing market structure or leveraging public control
- Open access to new infrastructure: buildings, transportation, and electric power
- Improving price transparency and timeliness
- Public engagement and education
- Mechanisms to align incentives among counter-parties (e.g. landlord-tenant)
- Public investments that generate positive externalities (e.g. research and development)
- International credibility and participation

REQUIRED READING:

Leggett, J. (2007) [*Climate Change: Current Issues and Policy Tools*](#). Congressional Research Service: Washington, D.C. Updated June 3, 2007. 36.
[*The Policy Toolbox – 23-32.*]

Many reading assignments in this set will be reduced to executive summaries and key excerpts.

The Climate Registry. (2008) [*General Reporting Protocol, Version 1.1.*](#)
Read the entire table of contents with care and choose a few parts of the manual of personal interest.

State of California. (2002) [*Vehicular Emissions: Greenhouse Gases*](#). (AB 1493). “Pavley bill”

Schwarzenegger, A. (2005) Executive Order S-3-05. [[*California Greenhouse Gas Emission Reduction Targets*](#)]

State of California. (2006) [*Global Warming Solutions Act*](#) (AB 32).

State of California. (2006) [*Electricity: Emission of Greenhouse Gases*](#) (SB 1368).

Schwarzenegger (2007). Executive Order S-01-07. [[*Low Carbon Fuel Standard.*](#)]

California EPA. (2007) [*AB32 Timeline and Advisory Committees*](#). 3

California EPA. (2007) [Climate Action Team Proposed Early Actions to Mitigate Climate Change in California](#). 20

Economic and Technology Advancement Advisory Committee (ETAAC). (2008) [Final Report: Technologies and Policies to Consider for Reducing Greenhouse Gas Emissions in California](#). California Air Resources Board: Sacramento, CA.

California Energy Commission. (2007) [2007 Integrated Energy Policy Report](#). CEC-100-2007-008-CMF. 250.

REFERENCE READING:

Parker, L. and J. Blodgett. (2008) [Global Climate Change: Three Policy Perspectives](#). Congressional Research Service: Washington, D.C. 38.

Helme, et al (2006) [Cost Effective GHG Mitigation Measures for California](#). Washington: Center for Clean Air Policy. 15.

Week 5

TAKING ACTION WITHOUT ADDRESSING THE GHG EXTERNALITY

TOPICS

- Addressing non-price barriers to emissions reductions
- No regrets options
- Command-and-control policy instruments
- *Policies that are essential if/when a carbon pricing regime fails*

REQUIRED READING:

National Action Plan for Energy Efficiency. (2007) [National Action Plan for Energy Efficiency Vision for 2025: Developing a Framework for Change](#). U.S. Environmental Protection Agency: Washington, D.C. 84.

Also skim this executive summary and comprehensive reference for different policy designs:

National Action Plan for Energy Efficiency. (2006) [National Action Plan for Energy Efficiency](#). U.S. Environmental Protection Agency: Washington, D.C. 216.

Yacobucci, B. and Parker, L. (2008) [Climate Change: Federal Laws and Policies Related to Greenhouse Gas Reductions](#). Congressional Research Service: Washington, D.C. Updated January 28, 2008. 20.

Center for Climate Strategies. "[Climate Policies that Work](#)." Accessed online August 5, 2008.

Hoffman, A. (2006) [Getting Ahead of the Curve: Corporate Strategies That Address Climate Change](#). Pew Center on Global Climate Change. 83.

Kammen and Nemet. (2005) [Reversing the Incredible Shrinking Energy R&D Budget](#). *Issues in Science & Technology*. Fall: 84-88.

CHOOSE TWO OF THE FOLLOWING:

Non-CO2 Greenhouse Gases

Choate, et al (2005) [Emission Reduction Opportunities for Non-CO2 Greenhouse Gases in California](#). California Energy Commission: Sacramento, CA. 83.

Agriculture & Forestry

Richards, et al. (2006) [Agricultural & Forestlands: U.S. Carbon Policy Strategies](#). Pew Center on Global Climate Change: Washington, D.C. 83.

Buildings

Brown, et al (2005) [Towards a Climate-Friendly Built Environment](#). Pew Center on Global Climate Change: Washington, D.C. 76.

Transportation

Greene and Schafer (2003) [***Reducing Greenhouse Gas Emissions From U.S. Transportation***](#). Pew Center on Global Climate Change: Washington, D.C. 68.

Laitner, J. (2008) [***Testimony to the Senate Committee on Energy and Natural Resources, July 23, 2008***](#). American Council for an Energy Efficient Economy: Washington, D.C.
[pages 11-17]

Week 6

DESIGN CONSIDERATIONS FOR ESTABLISHING A MARKET-BASED PRICE TO ADDRESS AN EXTERNALITY

TOPICS

- Rules make markets
- Carbon fees or taxes vs. Cap-and-trade
- Coverage
- Points of regulation
- Compliance obligation
- Enforcement authority
- International competitiveness provisions
- Petitions for special consideration
- *All of the previous six issues arise in both carbon tax / fee designs and cap-and-trade.*
- Linking taxes and cap-and-trade: Free allocation vs. auction of tradeable pollution allowances
- Predicting prices: modeling results and their hazards

REQUIRED READING:

Nordhaus, W. (2007) [To Tax or Not to Tax: Alternative Approaches to Slowing Global Warming.](#) *Review of Environmental Economics and Policy*. 1: 26-44.

Congressional Budget Office. (2008) [Policy Options for Reducing CO2.](#) Congressional Budget Office: Washington, D.C. 42.

Farrell and Lave (2004) **Emission Trading and Human Health.** *Annual Review of Public Health* 25: 119-138.

[Available via link through UC-Berkeley Main Library.]

Lohmann (2006) “[Lessons Unlearned](#),” in Carbon Trading: A Critical Conversation on Climate Change, Privatisation and Power. *Journal/Development Dialogue* 48. pp. 71-101.

Congressional Budget Office. (2007) [Trade-offs in Allocating Allowances for CO2 Emissions.](#) Congressional Budget Office: Washington, D.C. 8.

Ellerman, A.D. and P. Jaskow. (2008) [The European Union’s Emission Trading System in Perspective.](#) Pew Center on Global Climate Change, Washington, D.C. 64.

Orzag, P. (2008) [Implications of a Cap-and-Trade Program for Carbon Dioxide Emissions.](#) Testimony before the Committee on Finance, April 24, 2008. Congressional Budget Office: Washington, D.C. 15.

REFERENCE READING:

WRI. (2006) [Climate Policy Terminology](#). The Bottom Line on... Issue No. 1. World Resources Institute: Washington, D.C. 2.

On Market Design Considerations

LaCaount (2006) [Design Issues for Market-based Greenhouse Gas Reduction Strategies](#). Cambridge Energy Research Associates: Cambridge, MA. 1-20.

National Commission on Energy Policy. (2007) [Allocating Allowances in a Greenhouse Gas Trading System](#). National Commission on Energy Policy: Washington, D.C. 44.

On the EU Emissions Trading Scheme

Sijm, Neuhoff and Chen. (2006) [CO2 cost pass-through and windfall profits in the power sector](#). *Climate Policy* 6: 49-72.

[or freely available as a working paper]

Neuhoff, Martinez and Sato. (2006) [Allocation, incentives and distortions: The impact of EU ETS emissions allowance allocations to the electricity sector](#). *Climate Policy* 6: 73-91.

[or freely available as a working paper]

On Environmental Justice Concerns

EJ Matters. (2008) "[Theory vs Reality: Debunking the Myths of Cap-and-Trade](#)," www.ejmatters.org.

EPA. (2005) [The Acid Rain Program and Environmental Justice: Staff Analysis](#). Clean Air Markets Division, Office of Air and Radiation, U.S. Environmental Protection Agency: Washington, D.C. 23.

Week 7

NEGOTIATING COST CONTAINMENT AND ENVIRONMENTAL EFFECTIVENESS UNDER A CAP-AND-TRADE REGIME

TOPICS

- Cap for covered entities
- Distribution of pollution permits
- Types of offsets: Domestic and international
- Terms for offsets: Negotiating criteria for credit *and* liability
- Structure and influence of scientific review process
- Ten dimensions of cost containment
- Price control mechanisms and market oversight
 - safety valve
 - reserve-based
 - updating price buffers
- Linking with other countries, and integrating with states
- International competitive provisions, revisited

REQUIRED READING:

Competitiveness

House Committee on Energy & Commerce. (2008) "[Competitiveness Concerns / Engaging Developing Countries](#)," Climate Change Legislation Design White Paper. Subcommittee on Energy & Air Quality, House Energy & Commerce Committee, U.S. Congress: Washington, D.C. 16.

Houser, T. (2008) "[Trade Measures vs. Output-Based Rebating in US Climate Policy](#)," addendum to Leveling the Playing Field. Peterson Institute for International Economics: Washington, D.C. 3. [Presently only available via internal course website]

House Committee on Energy & Commerce. (2008) "[Getting the Most Greenhouse Gas Reductions for Our Money](#)," Climate Change Legislation Design White Paper. Subcommittee on Energy & Air Quality, House Energy & Commerce Committee, U.S. Congress: Washington, D.C. 43

Offsets

Ramseur, J. (2008) [The Role of Offsets in a Greenhouse Gas Emissions Cap-and-Trade Program: Potential Benefits and Concerns](#). Congressional Research Service: Washington, D.C. 39.

Lohmann. (2006) “[Offsets: The Fossil Economy’s New Arena of Conflict](#),” in Carbon Trading: A Critical Conversation on Climate Change, Privatisation and Power. *Journal/Development Dialogue* 48. pp. 219-221 plus one case study (your choice).

UN Environment Program. (2008) “[CDM pipeline](#).” Updated August 1, 2008. Accessed via homepage or under Publications: <http://cd4cdm.org/>.

Wara, M. and D. Victor. (2008) [A Realistic Policy on International Carbon Offsets](#). Working Paper #74, Program on Energy and Sustainable Development, Stanford University: Stanford, CA. 24.

Cost Containment

Pizer, W. [Climate Policy Design Under Uncertainty](#). Discussion Paper, RFF-05-44. Resources for the Future: Washington, D.C. 22.

Nemet, G. (2008) [Cost Containment for Climate Policy Requires Linked Technology Policies](#). Working Paper No. 2008-010. La Follette School of Public Affairs, University of Wisconsin-Madison. 35.

To be added:

Working paper on updating price buffers, containing costs relative to market trends rather than historical political negotiation.

Working paper on the role of a scientific review and design of a legal process for updating an emissions cap.

REFERENCE READING:

Fisher et al. (2006) [The Most Expensive Thing We Can Do Is Nothing: An Open Letter on Global Warming from California Economists](#). Union of Concerned Scientists. 1.

Competitiveness

Houser, T. (2008) [Leveling the Carbon Playing Field](#). Peterson Institute for International Economics: Washington, D.C. 112.
[free download by chapter]

*Hummel, H. (2008) Output Based Rebates. Draft working paper.
[Available only via internal course website.]*

Van Asselt and Biermann (2007) **European emissions trading and the international competitiveness of energy-intensive industries: a legal and political evaluation of possible supporting measures.** *Energy Policy* 35: 497-506.
[Available via link through internal course website to UC-Berkeley Library]

Grubb, M. and K. Neuhoff. (2006) [Allocation and competitiveness in the EU Emissions Trading Scheme: policy overview](#). *Climate Policy* 6: 7-30.

RGGI Emissions Leakage Multi-State Staff Working Group. (2008) [Potential Emissions Leakage and the Regional Greenhouse Gas Initiative](#). Regional Greenhouse Gas Initiative: New York, NY. 54.

Offsets

United Nations Environment Program. (2006) [*The Clean Development Mechanism: An Assessment of Progress*](#). 165.

Chadwick (2006) **Transaction costs and the Clean Development Mechanism**. *Natural Resources Forum* 30: 256-271.

[Available via link through internal course website to UC-Berkeley Library]

EJ Matters. (2008) “[**Carbon Offsets: A Lose-Lose Scenario to Address Climate Change**](#).” 4.

McCarl and Sands (2007) **Competitiveness of terrestrial greenhouse gas offsets: are they a bridge to the future?** *Climatic Change* 80: 109-126.

[Available via link through internal course website to UC-Berkeley Library]

Cost Containment

Orzag, P. (2008) [**Containing the Cost of a Cap-and-Trade Program for Carbon Dioxide Emissions**](#). Testimony before the Senate Committee on Energy and Natural Resources, May 20, 2008.

Jacoby, H. and A.D. Ellerman. (2002) [**The Safety Valve and Climate Policy**](#). MIT Joint Program on the Science and Policy of Global Change: Boston, MA.

Week 8

DESIGN ELEMENTS FOR A POLLUTION PERMIT MARKET

TOPICS

- Agency with market oversight authority
- Auction design: authority, frequency, eligibility for participation, limits on auction positions
- Trading: eligibility for participation, transparency of trading and derivative activity
- Permit characteristics: vintage and expiration, validity in multiple markets (e.g. state / fed / EU ETS)
- Early auction
- Credit for early action
- Managing market supply: scientific review *and* price control events
- Banking
- Borrowing
- Compliance period
- Agency with enforcement authority

REQUIRED READING:

RGGI

RGGI. (2007) [Overview of RGGI CO2 Budget Trading Program](#). Regional Greenhouse Gas Initiative, Inc: New York, NY. 12.

RGGI. (2008) [Design Elements for Regional Allowance Auctions under the Regional Greenhouse Gas Initiative, March 17, 2008](#). Regional Greenhouse Gas Initiative, Inc.: New York, NY. 3.

Skim this for its structure, not its draft substance; no comparable summary available for the actual rule

RGGI. (2006) [Summary of the Draft Model Rule for RGGI, March 23, 2006](#). Regional Greenhouse Gas Initiative, Inc: New York, NY. 5.

Skim this landmark document defining the first carbon cap-and-trade platform in the U.S.:

RGGI. (2007) [Regional Greenhouse Gas Initiative Model Rule, January 5, 2007](#). Regional Greenhouse Gas Initiative, Inc: New York, NY. 161.

Federal Cap-and-Trade Proposals

Parker, L., B. Yacobucci, and J. Ramseur. (2008) [Greenhouse Gas Reduction: Cap-and-Trade Bills in the 110th Congress](#). Congressional Research Service: Washington, D.C. 29.

[Course website will have a more recently updated version: June 11, 2008.]

Letter from Rep. Henry Waxman, Rep. Edward Markey, and Rep. Jay Inslee to Rep. Nancy Pelosi, Speaker of the U.S. House of Representatives. "[Climate Policy Principles](#)." April 22, 2008.

EU ETS

DEFRA. (2006) [An Operator's Guide to the EU Emissions Trading Scheme](#). Department for Environment, Food, and Rural Affairs: London, UK. 33. [Updated 2008].

Ellerman, A.D. and B. Buchner (2006) [Over-Allocation or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005 Emissions Data](#). Fondazione Eni Enrico Mattei. 49.

Kopp, R. (2007) [An Overview of the European Union Emissions Trading Scheme](#)," Congressional Testimony, March 26, 2007. Resources for the Future: Washington, D.C. 5.

McAllister, L. (2008) **Moving toward stringency in emissions trading: the problem of slack caps**. University of California-San Diego Law School. [Deferred until publication.]

Week 9

MIDTERM EXAM

The midterm allows students to demonstrate integration of key design concepts and some fluency in the issues before moving ahead. The exam will present some design puzzles based on actual legislation to provoke critical thinking. It will be “open book,” perhaps even “open laptop” (i.e. it is not a memorization, regurgitation exercise).

Week 10

POLICY OPTIONS AND POLITICAL CONSIDERATIONS FOR SPENDING PUBLIC FUNDS

TOPICS

- Ensuring the long-term *durability* of a price-based climate policy: insuring against political failure
- Moderating regressive cost burdens on low and middle-income families
- International competitiveness provisions, revisited II
- Congressional Budget Office claim on proceeds for “deficit reduction”
- Adaptation to climate impacts – domestic
- International obligations
 - International deforestation
 - Adaptation
 - Technology Transfer
- Energy technology research, development, demonstration, and deployment
- Public spending programs on mitigation: federal agencies, states, and utilities (LDCs)
- Ratepayer transitional assistance through reimbursement of system benefit charges
- Political payments and windfall profits

REQUIRED READING:

Greenstein, R., S. Parrott, and A. Sherman. (2008) [Designing Climate Change Legislation that Shields Low-Income Households from Increased Poverty and Hardship](#). Revised May 9, 2008. Center for Budget and Public Policy: Washington, D.C. 18.

Coward, R. (2008) [Carbon Caps and Efficiency Resources: How Climate Legislation Can Mobilize Efficiency and Lower the Cost of GHG Reduction](#). Testimony in a hearing on Efficiency and

Climate Policy before the Select Committee on Energy Independence and Global Warming, U.S. House of Representatives: Washington, D.C. 16.

Assigned excerpts:

Barnes, P. (2008) [Climate Solutions: A Citizen's Guide](#). Chelsea Green: White River Junction, VT. 112.

Markey, E. (2008) [Title by Title Summary: Investing in Climate Action and Protection Act](#). HR6186, 110th Congress. 10.

Lieberman-Warner Climate Security Act of 2007

Lieberman, J. (2007) [The Lieberman-Warner Climate Security Act of 2007 \(S.2191\)](#), as reported from the Senate Environment and Public Works Committee, December 5, 2007: Summary of the Core Bill. 13.

Assigned excerpts:

Energy Information Administration. (2008) [Energy Market and Economic Impacts of S.2191, the Lieberman-Warner Climate Security Act of 2007](#). Washington, DC. SR/OIAF/2008-01. 74.
All Data Available: <http://www.eia.doe.gov/oiaf/servicerpt/s2191/index.html>

Assigned excerpts:

EPA. (2008) **EPA Analysis of the Lieberman-Warner Climate Security Act of 2008**. U.S. Environmental Protection Agency: Washington, D.C. 193.
http://www.epa.gov/climatechange/downloads/s2191_EPA_Analysis.pdf

Stabenow, D. et al. (2008) **Climate Policy Principles**. Letter to Sen. Harry Reid, Majority Leader of the U.S. Senate, and Sen. Barbara Boxer, Chair of the Senate Environment and Public Works Committee, regarding climate change policy. June 6, 2008.
http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=b3685513-6c10-4ad7-b3ba-da04fe48e52e

REFERENCE READING:

CBPP. (2008) [How a "Climate Rebate" Would Work](#). Center for Budget and Public Policy: Washington, D.C. 3.

Osrag, P. (2008) [Options for Offsetting the Economic Impact on Low- and Moderate-Income Households of a Cap-and-Trade Program for Carbon Dioxide Emissions](#). Letter to the Honorable Jeff Bingaman, June 17, 2008. Congressional Budget Office: Washington, D.C. 13.

Week 11

STATE & LOCAL INITIATIVES

TOPICS

- The role of states in the formulation of U.S. federal climate policy
- Complementary policies, or policies that address non-price barriers to mitigation
- Addressing split incentives and principal-agent problems
- Control of utilities (Load Distribution Companies; and half the nation's generation) through Public Utility Commissions
- Government procurement policies
- Land-use planning
- Building codes, and the "30% solution"
- Addressing local and regional environmental justice concerns
- Education systems from pre-school to PhD
- Turning barriers into business opportunities

REQUIRED READING:

Ramseur, J. (2007) [Climate Change: Action by States to Address Greenhouse Gas Emissions](#). Congressional Research Service: Washington, D.C. 28.
[Course website will have version updated November 2007]

Aulisi, A. et al. (2007) [Climate Policy in the State Laboratory](#). World Resources Institute: Washington, D.C. 74.

Center for Climate Strategies. (2008) [CCS Catalog of Climate Actions](#). Center for Climate Strategies: Harrisburg, PA.

Midwestern Governors Association. (2007) [Energy Security and Climate Stewardship Platform for the Midwest](#). Midwestern Governors Association: Lombard, IL. 36.

California Air Resources Board. (2008) [Draft Climate Change Scoping Plan: A Framework for Change](#). California Air Resources Board: Sacramento, CA. 93.
Final version to be released Fall 2008.

Western Climate Initiative, <http://www.westernclimateinitiative.org/>
Framework plan should be released in September

REFERENCE READING:

U.S. Conference of Mayors. (2005) [Climate Protection Agreement](#). U.S. Conference of Mayors: Washington, D.C.
[~830 mayors have now signed.]

Conference of Governors on Climate Change. (2008) [Governor's Declaration on Climate Change](#). April 18, 2008. Yale University: New Haven, CT. 2.

[Midwestern States Greenhouse Gas Accord](#), 4.

Energy Efficient Codes Coalition. "[Thirty-Percent Solution](#)." Accessed August 5, 2008.

Bailie, et al. (2004) [Turning the Corner on Global Warming Emissions: An Analysis of Ten Strategies for California, Oregon, and Washington](#). The Energy Foundation: San Francisco, CA. 44.

Week 12

ECONOMIC ANALYSIS OF CLIMATE POLICIES

OR

ADAPTATION POLICY

OR

CHINA, INDIA AND OTHER MAJOR EMITTERS

After compiling materials for all three class periods, I would like to confer with other ERG faculty and students in the course before making a final judgment.

With limited time, we will not be able to cover all three with an entire class period. The session on economic analysis of climate policies involves the most rigorous academic material and offers the highest potential for developing sharper analytical skills. The other two are more topical. It may be possible to wedge adaptation policy and the major emitters into other class periods.

Week 13

INTEGRATION CHALLENGES ACROSS STATE, FEDERAL, AND INTERNATIONAL POLICIES

TOPICS

- Clean Air Act and compliance with the Supreme Court ruling in *Mass v. EPA*
- Battles over jurisdiction: Congressional committees, federal agencies, states vs. feds, etc.
- Federal pre-emption of state policies / Federal denial of state pre-emption of federal policies
- Complications with World Trade Organization rules and ongoing disputes
- Regulatory authority in the electric power sector, particularly grid infrastructure
- Demands for liability waivers for carbon sequestration
- Diffusing the federal Renewable Fuel Standard with substitution of fuel electricity
- Nationally crucial role of renewable *heating* provisions in state Renewable Portfolio Standards

REQUIRED READING:

EPA. (2008) [Advanced Notice of Proposed Rule-Making](#). U.S. Environmental Protection Agency: Washington, D.C. 493.
[Sections VI, VII, and VIII]

Meltz, R. (2008) [Climate Change Litigation: A Growing Phenomenon](#). Congressional Research Service: Washington, D.C. 38.
[Course website will have a more recent version, updated April 7, 2008]

Morgan, Apt and Lave. (2005) [The U.S. Electric Power Sector and Climate Change Mitigation](#). Pew Center on Global Climate Change: Washington, D.C. 84.

Presidential Climate Action Project. (2008) [Presidential Climate Action Plan](#). University of Colorado: Denver, CO. 184.
[updated edition due to be released in September or October 2008]

Green (2005) **Climate change, regulatory policy and the WTO - How constraining are trade rules?** *Journal of International Economic Law* 8: 143-189.
[Available via link through internal course website to UC-Berkeley Library]

Brewer (2003) **The trade regime and the climate regime: institutional evolution and adaptation.** *Climate Policy* 3: 329-341.
[Available via link through internal course website to UC-Berkeley Library]

Lohmann. (2006) “[Ways forward](#)” and “[Climate Justice Now! The Durbin Declaration on Carbon Trading](#),” in *Carbon Trading: A Critical Conversation on Climate Change, Privatisation and Power. Development Dialogue* 48. pp. 329-358.

REFERENCE READING:

Farrell, A., W.M. Hanneman, and C. Busch. (2006) "[Synthesis](#)," *Managing GHG Emissions In California*. Hanemann and Farrell, eds. January. 26.

Ellerman, A.D. (2007) [The EU Emission Trading Scheme: Prototype of a Global System?](#) Harvard Project on International Climate Agreements. Discussion Paper 08-02. 38.

Week 14

ARCHITECTING AN APOLLO-SCALE RESPONSE TO CLIMATE CHANGE

GUEST LECTURER: CONGRESSMAN JAY INSLEE

REQUIRED READING:

Inslee, J. and Hendricks, B. (2007) **Apollo's Fire: Igniting America's Clean Energy Economy**. Island Press: Boston, MA.

www.apollosfire.net [scanned excerpt available on course website]

Review from Week 8:

Letter from Rep. Henry Waxman, Rep. Edward Markey, and Rep. Jay Inslee to Rep. Nancy Pelosi, Speaker of the U.S. House of Representatives. "**Climate Policy Principles**." April 22, 2008.

<http://oversight.house.gov/documents/20080422101143.pdf>

Short interview with Congressman Inslee on climate policy

Look up the New Apollo Energy Act on Thomas (Library of Congress database), and browse the outline:

Inslee, J. (2007) **New Apollo Energy Act**. HR2809, 110th Congress, U.S. House of Representatives: Washington, D.C.

Look up all bills sponsored by Rep. Inslee on Thomas (Library of Congress database), and browse – be prepared to make the most of this opportunity!

REFERENCE READING:

Taylor, et al (2006) **Technological Innovation and Public Policy**. *Managing Greenhouse Gas Emissions In California University of California*. 3-1 to 3-31.

www.calclimate.berkeley.edu

Alic, et al (2003) **U.S. Technology and Innovation Policies: Lessons for Climate Change**. Pew Center on Global Climate Change. 47.

Gallagher, Holdren and Sagar (2006) **Energy-technology innovation**. *Annual Review of Environment and Resources* 31: 193-237.

Kammen (2006) **The Rise of Renewable Energy**. *Scientific American*. September. 84-93. [Available via course website through link to UC-Berkeley Library]

Week 15

INTERNATIONAL CLIMATE NEGOTIATIONS

Taught via link from COP 14 in Poznan, Poland

TOPICS

- UN Framework Convention on Climate Change
- Kyoto Protocol
- Bali Road Map
- Asia Pacific Partnership
- Major Economies Process
- Current negotiations at the 14th Convening of the Parties in Poznan, Poland

REQUIRED READING:

Shanahan, M. (2007) **A journalist's guide to the Bali climate conference**. International Institute for Environment and Development: London, UK. 4.

<http://www.ied.org/pubs/pdfs/17021IIED.pdf>

(will be replaced with update released for Poznan)

Review from Week 3:

United Nations. (1992) **United Nations Framework Convention on Climate Change**. United Nations: New York, NY. 25.

<http://unfccc.int/resource/docs/convkp/conveng.pdf>

United Nations. (1998) **Kyoto Protocol to the United Nations Framework Convention On Climate Change**. United Nations: New York, NY. 21.

<http://unfccc.int/resource/docs/convkp/kpeng.pdf>

UNFCCC. (2007) **Bali Action Plan**. UNFCCC Convening of the Parties 13. Bali, Indonesia. 5.

http://unfccc.int/files/meetings/cop_13/application/pdf/cp_bali_action.pdf

Browse this site to see development of sector-level approaches:

Asia-Pacific Partnership on Clean Development and Climate Change

<http://www.asiapacificpartnership.org/>

Browse this site to see development of negotiations among major emitters:

U.S. State Department. (2008) **Major Economies Process on Energy Security and Climate Change**.

<http://www.state.gov/g/oes/climate/mem/>

Fletcher, S. and L. Parker. (2008) **Climate Change: Kyoto Protocol, the Bali "Action Plan", and International Actions**. Congressional Research Service: Washington, D.C. 24.

<http://fpc.state.gov/documents/organization/80734.pdf> [January 2007]

[Course website will have version updated June 2008]

Hummel, H. (2007) **Debrief on Bali Roadmap**. Personal correspondence. December 2007. 15.

[\[http://www.holmeshummel.net/Bali-debrief.pdf\]](http://www.holmeshummel.net/Bali-debrief.pdf)

Aldy, J. and R. Stavins. (2008) **Economic Incentives in a New Climate Agreement**. Issue Paper prepared for the Harvard Project on International Climate Negotiations: Boston, MA. 9.
<http://belfercenter.ksg.harvard.edu/files/RS-JA%20Paper%20Economic%20Incentives%20080430.pdf>

Bell, R. (2006) “**The Kyoto Placebo**,” *Issues In Science and Technology*, Winter 2006. pp 28-31.
<http://www.earth.columbia.edu/grocc/documents/KyotoPlaceboISTDecember2005.pdf>

To be added:

Bali Road Map, updated working documents emerging from UNFCCC meeting in Accra, Ghana.

Week 16

SCHEDULED FINAL EXAM

*Final policy design projects may be submitted anytime
prior to the end of the final exam time assigned by the university:*

Congratulations!!

COURSE INFORMATION

The class will involve readings, lectures, short writing assignments, class discussion, and a research paper. Students should already have a basic understanding of climate change science and of economics.

Prerequisites: ER100 and graduate student standing, or consent of instructor.

Materials: The class covers a wide range of contemporary academic articles and policy analysis reports, all of which will be available at no cost through the course bSpace website. Many assignments will be *excerpts*.

Class participation, writing assignments and projects: Students will be expected to write a one-page (500 words) response to the assigned reading each week and post it to their Student Journal on bSpace by noon on Wednesday *prior* to that week's class. The quality of class discussion in a small seminar depends upon peer preparation, and class participation will be an important part of the course grade. The final exam will be a policy design project in the form of structured research paper. The project may be completed as an individual or in pairs, and milestones for development will pace the project through the semester.

Evaluation

Class participation:	20%
Reading reflections:	25%
Midterm exam:	20%
Project report:	35%

Office hours at the Energy Resources Group

By appointment, Wednesday and Thursday 10-12:00.

Other times on Thursday afternoons are possible by request.