Energy Markets Strategy
Yale School of Management MGT 820
Cross-listed at Yale School of Forestry and Environmental Studies, FES 80186

Class semester:	First half of fall 2009 semester (September 3 - October 15)
Class hours:	Tuesdays and Thursdays 10:00 – 11:20 A.M.
Class location:	A30

Course Syllabus

Overview

In the past 30 years, energy markets have changed from quiet, often heavily regulated, areas of the business landscape to some of the most dynamic markets in the world economy. Regulation of oil, natural gas, motor fuel, and electricity markets has been reduced dramatically in the U.S. and in many other countries. Electricity deregulation swept the industrialized and developing world, but it is now associated with the 2000-2001 California electricity crisis and the 2001-2002 Enron scandal. Oil prices have reached record levels with great uncertainty of where they are headed.

Drawing on the tools of economics, we study the business and public policy issues that these changes have raised. Topics include the political economy of deregulation, competition in wholesale electricity markets, market power and antitrust, and the transportation of energy commodities. We examine the economic determinants of industry structure and evolution of competition among firms in these industries, investigate successful and unsuccessful strategies for entering new markets and competing in existing markets, and analyze the rationale for and effects of public policies in energy markets.

Students will play strategy games to learn about the oil and electricity industries. They simulate OPEC countries in the oil industry and then for-profit firms in a restructured electricity market. The students solve for the collusive equilibria in the setting of a non-renewable resource and develop their own strategies given that monitoring oil production is imperfect. They will also have to consider how to operate in electricity markets given that there are capacity constraints, inelastic demand, and lack of storage.

Office Hours and Teaching Assistant

Professor:	Erin Mansur (erin.mansur@yale.edu)
Office hours (OH):	By appointment. 55 Hillhouse (Room 309)
Phone:	(203) 432-6233
Class web site:	https://classesv2.yale.edu/portal/site/fes80186_f09
Teaching assistant:	JF Thye (frederick.thye@yale.edu)
TA OH/location:	Hall of Mirrors, Thursdays 3-4 PM

Readings

Most readings are available on the class web site. However, some are in a course reader denoted [READER] in the list below or just list a web site's URL. Please complete the readings before class.

Assignments

Grades will be determined based on performance on the final exam, each of the two strategy games, and class participation and attendance. The grades on the games will depend both on your team's profits and your strategy memos. The final exam will be a take home, open note, open readings exam. The exams will be handed out on October 15 and will be due by October 26 (by 9:00 AM). Course grades will be determined as such:

Final Exam	40%
OPEC Strategy Game	20%
Electricity Strategy Game	20%
Class attendance and participation	20%

Rounds of Strategy Games

<u>OPEC</u>

Round a (Auction)	Friday	September 11	noon
Round b (Meeting)	Tuesday	September 15	In-class
Round 1	Wednesday	September 16	11:59 PM
Round 2	Thursday	September 17	11:59 PM
Round 3	Friday	September 18	11:59 PM
Round 4	Monday	September 21	11:59 PM
Round 5	Tuesday	September 22	11:59 PM
Round 6	Wednesday	September 23	11:59 PM
Strategy memo due	Thursday	October 1	In-class

<u>Electricity Strategy Game (ESG)</u>

Round a (Auction)	Tuesday	September 29	In-class
Round 1	Friday	October 2	noon
Round 2	Monday	October 5	11:59 PM
Round 3	Tuesday	October 6	11:59 PM
Round 4	Wednesday	October 7	11:59 PM
Round 5	Thursday	October 8	11:59 PM
Round 6	Friday	October 9	11:59 PM
Strategy memo due	Thursday	October 15	In-class

COURSE PLAN AND READING LIST

September 3. Lecture 1: Overview of Energy Markets

OPEC Strategy Game Introduction

US EIA. 2009. *Annual Energy Review, 2008*. 1-34.

OPEC Game Instructions.

September 8. Lecture 2: Pricing Exhaustible Resources

Krautkraemer and Toman. 2003. "Fundamental Economics of Depletable Energy Supply."

Maass. 2005. "The Breaking Point," *NY Times Magazine,* Aug 21.

September 10. Lecture 3: Pricing with Market Power and Oil Industry

Peirce. 1996. *Economics of the Energy Industries*. Ch 9. [READER]

Hamilton. 2008. "Understanding Crude Oil Prices."

Deffeyes. 2001. *Hubbert's Peak: The Impending World of Oil Shortage*. Ch 1. Go to http://press.princeton.edu/chapters/s7121.pdf

Oster *et al*. 2007. "As Oil Price Sets New High, Stress Hits Developing Nations." *Wall Street Journal*, November 1.

Kotchen and Burger. 2007. "Should we drill in the Arctic National Wildlife Refuge? An economic perspective." *Energy Policy*, 4720-9.

September 15. Lecture 4: OPEC Meeting

September 17. Lecture 5: Introduction to the Electricity Industry

Griffin and Puller. 2005. "A Primer on Electricity and the Economics of Deregulation," in *Electricity Deregulation: Choices and Challenges*, Griffin and Puller eds. 1-11.

Joskow. 2006. "Markets for Power in the United States: An Interim Assessment," *Energy Journal*, 1-36.

September 22. Lecture 6: Scarcity Pricing and Electricity

Borenstein. 2000. "Understanding Competitive Pricing and Market Power in Wholesale Electricity Markets," *Electricity Journal*, 49-57.

Borenstein. 2002. "The Trouble with Electricity Markets: Understanding California's Restructuring Disaster." *J. Econ. Perspectives*: 191-211.

Instructions for the Electricity Strategy Game

September 24. Lecture 7: Introduction to the Gasoline Industry

Electricity Strategy Game Introduction

Borenstein and Bushnell. 2005. "Retail Policies and Competition in the Gasoline Industry."

Muehlegger. 2006. "Market Effects of Regulatory Heterogeneity: A Study of Regional Gasoline Content Regulations."

September 29. Lecture 8: Vertical Integration and Gasoline

ESG auction

Hastings. 2004. "Vertical Relationships and Competition in Retail Gasoline Markets: Empirical Evidence from Contract Changes in Southern California," *American Economic Review*, 317-28.

Considine. 2006. "Is the Strategic Petroleum Reserve Our Ace in the Hole?" *Energy Journal*, 91-112.

October 1. Lecture 9: Regulation and the Natural Gas Industry

OPEC game memo due

Viscusi *et al*. 2005. "Theory of Natural Monopoly," *Economics of Regulation and Antitrust*, 401-28. [READER]

Viscusi *et al*. 2005. "Economic Regulation of Energy," *Economics of Regulation and Antitrust*, 641-88. [READER]

October 2, 10 am. Visit to Yale Central Power Plant

October 6. Lecture 10: Deregulation and the Enron Case Study

Futures

MacAvoy. 2000. *The Natural Gas Market: Sixty Years of Regulation and Deregulation*, 1-17. [READER]

Bhatnagar and Tufano. 1995. "Enron Gas Services." HBS case 9-294-076.

US EIA. 2002. "Derivatives and Risk Management in the Petroleum, Natural Gas, and Electricity Industries," 3-14. (15-28 optional)

Carlisle. 2002. "Asset Helps Keep Canada's EnCana Afloat," *Wall Street Journal*, Oct 7.

October 8. Lecture 11: Incentive Based Regulation and Nuclear Power

Joskow. 2006. "The Future of Nuclear Power in the United States."

Viscusi *et al*. 2005. "Natural Monopoly Regulation and Electric Power." *Economics of Regulation and Antitrust*, 429-64. [READER]

Demoro. 1987. "PUC Staff Says PG&E Should Pay for Diablo." *San Francisco Chronicle*, May 15.

Herscher and Dietz. 1988. "Agreement Reached On Diablo Canyon Cost." *San Francisco Chronicle*, June 28.

October 13. Lecture 12: Guest Lecture

Matt LeBlanc and Rob Howard, ArcLight Capital Partners, LLC.

October 15. Lecture 13: Renewables

Palmer and Burtraw. 2005. "Cost-Effectiveness of Renewable Electricity Policies." *Energy Economics*, 873-94.

Lamont. 2008. "Assessing the Long-Term System Value of Intermittent Electric Generation Technologies." *Energy Economics*, 1208-31.

Knittel *et al*. 2009. "Greenhouse Gas Reductions under Low Carbon Fuel Standards?" *American Economic Journal: Economic Policy,* 106-46.

Rather. 2006. "Is the Answer Blowing in the Wind?" *NY Times*, Nov 5.