

PRINCETON UNIVERSITY
WOODROW WILSON SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

WWS582e: Energy Economics

Instructor: Amy Craft
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Class Hours: Tuesdays and Thursdays
10:40 a.m.– 12:10 p.m.

Course Overview

The objective of this course is to study the economic principles underlying various energy markets and the governmental policies and regulations pertaining to them. We will begin by examining the markets of several fossil fuels, including oil, natural gas and fossil fuel-fired electricity, as well as current policy issues pertaining to them. We will study the economics of depletable natural resources and examine key policy questions like whether the U.S. should maintain a strategic petroleum reserve or whether speculation can drive up the price of oil. We then will discuss the environmental impact of these types of fuels with an emphasis on their effect on the climate. This time will be spent examining the various policies that may be used to address the energy sector's impact on climate change. Next, we will examine closely the economics of new technology investment, including renewable energy sources and energy efficiency technologies. With an eye towards environmental concerns, we will examine key questions such as whether private incentives are sufficient for the right amount of new technology innovation. Finally, we will delve into the economics of transportation, again with an emphasis on the impact this sector has on the environment. These last lectures will focus on the economics of switching to new transportation fuels, such as biodiesel.

Course Materials

This is a lecture course which requires class participation in order to be successful. Class lectures will follow the assigned reading and thus will be more meaningful if the reading is done before class. The textbook for this course is

Tietenberg, *Environmental and Natural Resource Economics*, 7th Edition,
Boston, MA: AddisonWesley, 2006.

There is also a class reading packet. Most of these articles are available on the class website.

Course Requirements and Grading

Most classes will be a lecture from the instructor or a guest speaker. A few classes throughout the semester, though, will be devoted to the discussion of relevant policy issues. During these sessions, the instructor will not spend much time lecturing at the board. Instead, the time will be spent in a full-class discussion of a current policy issue based on the assigned readings and drawing upon the concepts learned during lecture. Each student or a group of students will be asked to lead one of these policy discussions. A small portion of your final grade is based on class participation including your effectiveness as policy discussion leaders.

There will be three problem sets assigned throughout the semester. They will draw upon economic concepts learned during lecture and are intended to solidify these basic principles. You may work on these problem sets in groups, however each student must write up and hand in their own work. There will also be a take-home midterm exam during the last week before spring break. Students should work independently on this exam. While there is no final exam, students are asked to complete a term paper (15-20 pages) on a relevant energy policy or topic. Successful projects will incorporate the concepts discussed in class. There are several deliverables related to this paper. A paper proposal (1-2 pages) is due on March 31 during class. Students are also asked to give a class presentation of their topic and any results during the last two weeks of class. The final paper is due on Dean's Date, May 13.

Grades are assessed according to the following weights:

Problem Sets	15%
Midterm exam	30%
Final Paper Presentation	10%
Final Paper	35%
Class Participation:	10%

Course Outline

Feb. 3	Introduction and Course Overview
Feb. 5	Energy Demand and Conservation
Feb. 10	Energy Supply and Price Formation – Basic Hotelling Model
Feb. 12	Energy Supply and Price Formation – Advanced Hotelling Model
Feb. 17	Energy Price Formation – The Role of Financial Markets
Feb. 19	Imperfect Competition in Energy Markets – Oil and OPEC
Feb. 24	Discussion: Oil and Energy Security
Feb. 26	Regulation of Energy Markets and Natural Gas
Mar. 3	Economics of Electricity Generation

- Mar. 5** **Deregulation of Electricity Markets**
- Mar. 10** **External Effects of Energy Use -- Pollution**
- Mar. 12** **Midterm Exam**
- Mar. 24** **Economics of Pollution Control – NO_x and SO_x**
- Mar. 26** **The Economics of Climate Change**
- Mar. 31** **Climate Change Policy Options**
- Apr 2** **Technological Change and Climate Change Policy**
- Apr. 7** **Renewable Energy Overview**
- Apr. 9** **Renewable Energy Policies**
- Apr. 14** **Economics of Transportation Fuels**
- Apr. 16** **Guest Lecture**
- Apr. 21** **Discussion: Transportation Fuel Use Policies**
- Apr. 23-30** **Student Presentations on Term Paper Topics**
- May 12** **Dean's Date, Term Paper Due**