

Energy Economics and Policy

11:373:335 3 credits

Prerequisites: 11:373:121 or 01:220:102

Environmental and Business Economics Curriculum

School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey

Professor:

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Office hours:

Thursday from 2:10-3:10

Texts:

These texts have been ordered for our class. Whether you purchase it is up to you; however, it is a widely accepted standard reference for our field, and would be a worthwhile addition to your personal library.

Godfrey Boyle. 2012. Renewable energy: power for a sustainable future, Third edition, Oxford Press.

Anil Markandya, Andrea Bigano, and Roberto Porchia. 2010. The Social Cost of Electricity: Scenarios and Policy Implications, FEEM.

Roy L. Nersesian. 2010. Energy for the 21st Century: A Comprehensive Guide to Conventional and Alternative Sources

Other publications with which you may want to be acquainted with:

Committee on U.S.-China Cooperation on Electricity from Renewable Resources; National Research Council; Chinese Academy of Sciences; Chinese Academy of Engineering. 2010. "The Power of Renewables: Opportunities and Challenges for China and the United States," available at <http://www.nap.edu/catalog/12987.html>

America's Energy Future Panel on Alternative Liquid Transportation Fuels; National Academy of Sciences; National Academy of Engineering; National Research Council. 2009. "Liquid Transportation Fuels from Coal and Biomass Technological Status, Costs, and Environmental Impacts," This PDF is available from the National Academies Press at: <http://www.nap.edu/catalog/12620.html>

The National Research Council. 2011. "Renewable Fuel Standard: Potential Economic and Environmental

Effects of U.S. Biofuel Policy,” available at http://www.nap.edu/catalog.php?record_id=13105.

The National Research Council. 2011. “Well-Deepwater Horizon Blowout,” available at http://www.nap.edu/catalog.php?record_id=13273.

Genie out of the Bottle: World Oil Since 1970, Morris Adelman;

Hubbert’s Peak: the Impending World Oil Shortage, Kenneth Deffeyes;

Petroleum Economics: Issues and Strategies of Oil and Natural Gas Production, Rognvaldur Hannesson

The Quest: Energy Security, and the Remaking of the Modern World, Daniel Yergin

Energy and Environmental Policy in China, ZhongXiang Zhang (2011)

Learning Goals:

Learning goals will be achieved by providing students with ability to apply and communicate microeconomic principles for policy formulation and decision making in energy. By the end of the course, students should be able to:

1. Formulate energy-related policies (related to the transportation, power, heat, and electricity) to accomplish objectives that can be stated in economic terms.
2. Understand the most common economic and environmental causes of energy policy problems.
3. Diagnose potential energy policy problems and understand the economic policy used to correct these problems in market, as well as non-market, economies.
4. Extend the concepts discussed in class to understand renewable and alternative energy contexts, and develop and analyze new policies to address new concerns.

Course Policies:

A. Class Participation

This is a participatory class; you will frequently be asked during class discussions to (i) offer your opinions about the realism of major assumptions and (ii) draw on your personal experience to offer insights into the logical steps required to arrive at key conclusions. (These responsibilities are much easier to meet if you have done the reading ahead of time.)

B. Required Readings

Our discussions will draw upon an intermediate knowledge of microeconomics. To help you integrate energy economics with your prior knowledge of economics as quickly as possible, lectures have been prepared presuming you are familiar with the content of required readings before arriving in class. Each

required reading within a subject area will be indicated with an asterisk (*); read this before we begin to discuss the listed topic.

C. Other Related Readings

This syllabus has been prepared to serve not only as a guide to the course, but also to give you some exposure to literature in energy economics. For this reason, this syllabus includes some examples of recent published research from major publishers and journals. The citations are not intended to be an exhaustive list. They have been included to give you examples of influential or representative approaches and to help you gain more from our class discussions. Lectures will frequently make references to related material, but it will never be presumed that you have read any of the other related readings (in contrast to required readings, above). If you are interested in representative articles on subjects other than those listed in the syllabus, please contact me and I will attempt to provide you with additional citations.

D. Lecture Strategy

The lectures will use the readings as starting points, but will contain references to other readings, empirical results, syntheses of trends in the literature, and discussion of key points from the other relevant readings. Missing a lecture will cost you understanding and perhaps a key inspiration you are seeking. We have roughly thirty hours together.

E. Rutgers University Policies

All faculty, staff, and students at our University are bound by University policies. All aspects of this course will be conducted according to these policies. (Please see 7 for additional information.)

Grading Policies:

9% Instructor's Discretion
21% Weekly Quizzes
40% Midterm Exams (2, 20% each)
30% Term paper

Weekly Quizzes

The course includes five general topic areas. A short quiz will be given in class each week based on concepts discussed in class. You can drop up to two quizzes for any reason. No makeup quizzes will be offered without written medical, religious, or legal documentation. Quizzes missed for documented medical, religious, or legal reasons must be made up within one week of returning to class.

Term paper

The term paper should be 10-15 pages long, and should address energy issues. It should provide an economic perspective and follow the format of a policy memo. The paper is to be handed in on the last day before Thanksgiving. No extensions will be given.

Letter Grade Assignments:

At any time you may calculate your grade in this course. There is a total of 100 points possible (see above). Final grades will be assigned using the scale given below. To calculate your expected final grade, simply add the grades from your completed exams with the grades you plan to get on forthcoming exams and refer to the table below.

90+ A
85+ B+
80+ B
75+ C+
70+ C
60+ D
60- F

Lecture/Discussion Schedule:

Session 0, week 1

Introduction to the course

Introduction

Session 1, week 1:

Basic principles in economics

(Quiz 1)

Review.

Sessions 2-14, weeks 2-7:

Oil & Gas

(Quiz 2, 3 & 4)

1. History of oil industry (sessions 2-4)
2. Principles of oil production (sessions 5-9)
 - a. Importance of infrastructure
 - b. Economic theory of the mine, as applied to petroleum
 - c. Peak oil
3. Societal management of oil wealth (sessions 10-11)
4. Comparison of oil economics and gas economics (session 12-13)
5. Institutional issues related to natural gas production, distribution and sales (session 14)

Genie out of the Bottle: World Oil Since 1970, Morris Adelman;

Hubbert's Peak: the Impending World Oil Shortage, Kenneth Deffeyes;

Petroleum Economics: Issues and Strategies of Oil and Natural Gas Production, Rögnvaldur Hannesson

The Quest: Energy Security, and the Remaking of the Modern World, Daniel Yergin

Session 15, week 8:

Review session

Session 16, week 8:

First midterm

Session 17-18, week 9:

Energy and the environment

(Quiz 5)

* Chapter 4, Anil Markandya, Andrea Bigano, and Roberto Porchia. 2010. "The Social Cost of Electricity: Scenarios and Policy Implications"

Energy and Environmental Policy in China

Sessions 18-24, weeks 10-12:

Alternatives to conventional fossil fuels

(Quiz 6 & 7)

1. Unconventional alternatives: (session 17)
 - a. Tar sand
 - b. Shale gas
2. Renewable alternatives: (sessions 18-22)
 - a. Biomass
 - b. Wind
 - c. Solar
 - d. Hydroelectric
 - e. Geothermal
 - f. Nuclear

The Quest: Energy Security, and the Remaking of the Modern World, Daniel Yergin

* Chapters 3, 4, & 8, Roy L. Nersesian. Energy for the 21st Century: A Comprehensive Guide to Conventional and Alternative Sources

Session 25-28, week 13-14 (Quiz 8):

1) Transportation, electricity, power, and heat

* Summary and chapter 1, "The Power of Renewables: Opportunities and Challenges for China and the United States."

2) Evaluating energy policies

* Anil Markandya, Andrea Bigano, and Roberto Porchia. 2010. "The Social Cost of Electricity: Scenarios and Policy Implications," FEEM.

3) Energy security

* Chapter 2, Anil Markandya, Andrea Bigano, and Roberto Porchia. 2010. "The Social Cost of Electricity: Scenarios and Policy Implications"

4) Oil and Gas policy

* Summary and chapter 1, The National Research Council. 2011. "Well-Deepwater Horizon Blowout."

5) The US biofuel policy

* Summary and chapter 1, The National Research Council. 2011. "Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy."

"Biofuels and the Environment: First Triennial Report to Congress," 2011

6) Transforming Transportation

* Summary and chapter 1, "Liquid Transportation Fuels from Coal and Biomass Technological Status, Costs, and Environmental Impacts,"

Session 29, week 15:
Summary and Review

Session 30, week 15:
Second midterm exam

Other Information:

During severe weather conditions, class cancellation information is available on the recorded message system at (732) 932-7799, or by following links at the Rutgers web site, www.rutgers.edu.

Rutgers University Policies:

A typical reference for Rutgers University policies that will be used in the conduct of this course is pp. 492-500 in Rutgers, The State University of New Jersey, Campus at New Brunswick. New Brunswick Undergraduate Catalog. 1997-1999. New Brunswick.

All sections of this discussion on policy are of vital importance to you as a Rutgers University student; however for the purposes of this course, please pay particular attention to sections on Registration, Attendance, Nondiscrimination, Policy Against Insult, Defamation, and Harassment, Sexual Harassment, Administrative Policy for Responding to Disruptions, Academic Integrity, and the University Student Disciplinary Hearing Procedure.

Should you have any questions about Rutgers University policies, please contact the personnel listed in the current Undergraduate Catalog.