University of Hawaii at Manoa
Department of Economics

ECON 336 Fall 2014
Energy Economics (Tentative Syllabus)
TR 10:30-11:45am Webster Hall 103

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Office Hours: MW 3:00-4:15

Learning Objectives and Course Content:
This course reviews economic and policy aspects of energy issues. Topics include the economics of major nonrenewable and renewable energy options as well as the energy mix between various fossil-fuel and renewable energy options. Students will learn about:

1. Basic economic concepts for analyzing energy supply and demand;
2. Major criteria used in policy discussions and their validity (e.g. efficiency, energy security, energy independence, sustainability);
3. Major positive and normative issues and analytical tools in energy economics and policy.
4. The current market structures of nonrenewable and renewable energy options;
5. How to analyze the effects of alternative renewable-energy policies, with applications to renewable energy development in Hawaii.

Prerequisites:
College calculus and principles of economics, or consent.

Course Requirements:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Problem Sets</td>
<td>20%</td>
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<td>Midterm</td>
<td>20%</td>
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<tr>
<td>Final exam</td>
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<tr>
<td>Group project, presentation, participation</td>
<td>30%</td>
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There will be periodic problem sets to understand the theory of energy economics and policy and to apply the theory in the context of renewable energy. The problem sets consist of (i) analytical exercises that involve graphical analysis and elementary calculus in order to understand decision making by energy producers, consumers, and regulators as well as market allocations of energy; (ii) cost-benefit analysis exercises of renewable energy policies, and (iii) short-essay questions on renewable energy policies.

In class, you will be asked to present an overview of a selected renewable energy option from an economics point of view. The instructor will guide you in terms of the references and the content of your presentations.

You will also participate in a group project addressing the policy aspects of renewable energy options in Hawaii, where you apply cost-benefit analysis and/or other research tools that you will learn in class.
Textbooks
Required:
Keohane, N.O. and Olmstead, S. M. Markets and the Environment [Paperback], Island Press
(Listed Price: $22.5) (KO)
Viscusi, K., Harrington, J., and Vernon, J. Economics of Regulation and Antitrust 4th Edition,
MIT Press. (Electronic version available at UHM Libraries) (VHV)
Optional:
Moselle, Boas, Jorge Padilla and Richard Schmalensee, eds. Harnessing Renewable Energy in

Topics to be covered

0. Introduction: why economics to think about energy?
   a. Energy use in historical perspective
   b. Why economics
   c. Measurements and key concepts of energy

Readings:
OECD/IEA World Energy Outlook 2010
US Energy Information Agency (EIA) Energy Basics 101
KO: Chapters 1 & 2

1. Review of the fundamentals: perfectly competitive markets; price elasticity; static and
dynamic efficiency; Pareto optimality; producer and consumer surplus; deadweight loss
2. Economics of producer behavior: Firm and industry supply; factor markets
4. Economics of energy efficiency
5. Economics of regulation: Policy instruments, overview of the regulatory process, the
   theory of regulation, regulation of a natural monopoly
6. Electricity market regulation and deregulation
7. Market-based emissions regulation
8. Overview of major fossil-fuel energy options and nuclear power
   a. Coal: market structure, “clean coal,” carbon capture and sequestration
   b. Oil: world oil market, energy security, the price trend in the past and the future
   c. Natural Gas: regulation, deregulation, and markets
   d. Nuclear power: energy security and waste management
9. Economic and policy aspects of electricity markets
   a. Generation, transmission and distribution
   b. Public utility regulation, rates-of-return regulation, and electricity pricing
   c. Smart grid and information security
   d. Energy efficiency and energy conservation
10. Overview of major renewable energy options
    a. Hydropower
    b. Solar power (thermal and photovoltaic, decentralized vs centralized)
    c. Wind power
d. Biofuels

e. Geothermal, ocean thermal energy conversion, energy storage technology, and other options

11. Policies to support renewable energy
   a. Price-based instruments including feed-in tariffs
   b. Quantity-based instruments including renewable portfolio standards
   c. Subsidies and tax credit for energy development
   d. Welfare consequence: gains to consumers and producers, distributional impacts

12. Energy use and renewable energy potential in Hawaii
   a. Application: Hawaii Clean Energy Initiative (HCEI)
   b. Hawaii Act 234 (Greenhouse gas emission reduction)
   c. Perspectives on energy import dependence
   d. Evaluations of various renewable energy options

13. U.S. national aspects and global aspects of renewable energy
   a. Energy demand and supply in the long run
   b. Climate change and other environmental constraints

14. Renewable energy in the context of climate-change policies
   a. Economics of climate change: how much greenhouse gas emissions should be controlled, and how fast?
   b. Policies to reduce GHG emissions and their implications to renewable energy development: emissions tax, emissions trading, voluntary approaches, carbon credits and offsets
   c. International agreements on climate change mitigation
   d. Renewable energy policies in the context: renewable energy certificates REC, climate registries

**Disability Access**
If you feel you need reasonable accommodations because of the impact of a disability, please: (1) contact the KOKUA Program (V/T) at 956-7511 or 956-7612 in room 013 of the QLCSS (Queen Lili‘uokalani Center for Student Services); (2) speak with me privately to discuss your specific needs. I will be happy to work with you and the KOKUA Program to meet access needs related to a documented disability.

**Academic Honesty**
Acts of dishonesty, including cheating and plagiarism, subjects a student to the disciplinary process and sanctions as described at the following UHM website.
http://studentaffairs.manoa.hawaii.edu/policies/conduct_code/proscribed_conduct.php