

World Trade in Energy Resources

ENV 131.01 / ENV 298.76

MW 2:50 – 4:05 pm, Rm XXX LSRC

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Course Description

The purpose of this course is to give students a basic understanding of how world trade in energy resources currently works and in what ways the system is evolving as changes occur in the availability of these resources, the demand for them, and how they are used. The course is a follow on to Energy & Environment (ENV 130.1/298.18), but can be taken independently of it. Energy & Environment is a broad survey course, introducing students to the societal importance of energy, the major energy sectors (oil & gas, coal, renewables and electricity), energy economics and policy, and the environmental impacts of energy use. In contrast, this course focuses down more on what are currently the most important sources of energy, fossil fuels, and how they are physically, economically and geopolitically moved about the world. Renewable resources are also considered, but primarily in the context of their current deployment by major users of energy to offset possible future shortfalls in traditional fuels and/or reduce CO₂ emissions.

The course is intended for advanced undergraduate and beginning graduate students. It is meant to impart these students with deeper insight as to the happenings behind current and developing news headlines on energy. To accomplish this, the course is subdivided into four main modules. Module one presents the geologic, economic, political and societal context for world trade in energy resources. Module two highlights the major players involved in energy trading, the suppliers and consumers and their motivations. Module three examines the energy value chain, i.e. how energy resources are recovered, upgraded for use in society, and distributed nationally and internationally. And module four introduces energy markets; how energy resources are priced and traded, and how this trade is regulated. The fifth module is a class exercise, which is addressed under assignments and grading.

There are two additional points of note. A number of the lecture topics, like deregulation and globalization, are the subjects of whole courses. As such, this course will not delve into the theoretical underpinnings of these topics but instead serve as a practical guide to them as they relate to energy, an approach in keeping with the scope of the course. Secondly, modules two through four contain lectures that will seek to illustrate energy issues through case studies. These will generally contrast how an energy issue is being dealt with by one or more countries facing different needs.

Course Format

Each class will begin with a 10-15 minute questioning of students on current events in or affecting the global energy market as gleaned from the Wall Street Journal and other news sources. This will be followed by a 45-50 min lecture on the topic of the day according to the

course schedule. The remaining time will be devoted to open discussion or class debate about issues raised by the lecture.

Assignments and Grading

Both the ENV 130.1 and 298.XX sections of the course will be given four exams, one at the end of each module in order to keep students current with the material presented in class. Students in the ENV 298.XX section will also lead the class in a scenario building exercise on the future of coal resources. This exercise will be based on the approach pioneered by Shell Oil Company to help identify major risks and opportunities as the future unfolds.

Grading for the two sections of the course will be as follows:

ENV 130.1

Exams (20% ea.)	80%
Class participation	20%

ENV 298.XX

Exams (15% ea.)	60%
Scenario exercise	30%
Class participation	10%

Readings

The Wall Street Journal is to be reviewed daily. Background readings for each lecture will be drawn from a variety of sources and posted on Blackboard.

Course Schedule

Module 1 –Energy Resources and Society

Class 1: The Major Energy Resources

What they are and how they are used

Readings (pages TBA):

Younquist, 1997, GeoDestinies: The Inevitable Control of Earth Resources Over Nations and Individuals

Class 2: The Geologic History of Energy Resources

Their origins and why they are where they are

Readings (pages TBA):

Deffeyes, 2003, Hubbert's Peak: The Impending World Oil Shortage
Tarbuck et al., 2005, Earth Science

Class3: Human History Associated with Energy Resources

Trade, exploration and warring for energy in the evolution of nations

Readings (pages TBA):

Smil, 1994, Energy in World History
Klare, 2002, Resource Wars: The New Landscape of Global Conflict

Class 4: The Current Economic/Political Importance of Energy Resources
Balance of trade and energy, and industrial to societal teleconnections

Readings (pages TBA):

Yergin, 1993, The Prize: The Epic Quest for Oil, Money & Power
Yergin and Stanislaw, 1998, The Commanding Heights: The Battle for the
World Economy

Class 5: The Relationship of Energy to Other Mineral Resources
The symbiosis between fuels, ores, water and soil

Readings (pages TBA):

Younquist, 1997, GeoDestinies: The Inevitable Control of Earth
Resources Over Nations and Individuals

Class 6: Exam I

Module 2 – The Energy Resource Traders

Class 7: Global Supply of Energy Resources
Discoveries vs. production and what really constitutes reserves

Readings (pages TBA):

Campbell, 1988, The Coming Oil Crisis
Jaccard, 2005, Sustainable Fossil Fuels: The Unusual Suspect in the Quest
for Clean and Enduring Energy

Class 8: Major Suppliers
Case studies: Mexico, Saudi Arabia and Russia

Readings (pages TBA):

Younquist, 1997, GeoDestinies: The Inevitable Control of Earth
Resources Over Nations and Individuals
Selected articles from The Economist

Class 9: Global Demand for Energy Resources
The impact of growth in population and living standards

Readings (pages TBA):

Meadows et al., 2004, Limits to Growth: The 30-Year Update

Class 10: Major Demanders
Case studies: United States, Japan and China

Readings (pages TBA):

Younquist, 1997, GeoDestinies: The Inevitable Control of Earth
Resources Over Nations and Individuals
Selected articles from The Economist

Class 11: Ownership and Access to Energy Resources
Private vs. national management of resources

Readings (pages TBA):

Orban, 2000, Money in the Ground
Klare, 2002, Resource Wars: The New Landscape of Global Conflict

Class 12: Exam II

Module 3 – The Energy Resource Value Chain

Class 13: Exploration & Production

What it is, who the industry is and how it is being changed by resource scarcity

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 14: Refining

What it is, who the industry is and how it is being changed by resource security

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 15: Distribution

What it is, who the industry is and how it is being changed by resource demand

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 16: The Importance of Infrastructure

Case studies: Drilling, piping, shipping and storage

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 17: Current Impact and Future Implications of Distributed Generation

Case studies: Wind and solar power generation in the U.S., EU and China

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 18: Exam III

Module 4 – Energy Resource Markets

Class 19: Pricing Energy Resources

Benchmarks, pricing points, spreads and spot prices vs. futures

Readings (pages TBA):

Dahl, 2004, International Energy Markets: Understanding Pricing, Policies and Profits

Class 20: Price Controls

Case studies: Regulation and de-regulation of oil and gas in the U.S.

Readings (pages TBA):

Economides and Oligney, 2000, The Color of Oil: The History, the Money and the Politics of the World's Biggest Business

Class 21: Energy Trading

Price volatility and hedging

Readings (pages TBA):

Dahl, 2004, International Energy Markets: Understanding Pricing, Policies and Profits

Class 22: Emissions Trading

Case studies: U.S. SO₂ market and EU CO₂ market

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 23: Market Offsets due to Renewables

Case studies: Wind and solar power generation in the EU

Readings (TBA):

Selected articles from The Economist and The Wall Street Journal

Class 24: Exam IV

Module 5 – Class Exercise: Future Scenarios for Coal

Class 25: Scenario Planning I

Class 26: Scenario Planning II

Class 27: Scenario Planning III

Class 28: Scenario Planning IV