

**FINA 7397 – 04 32975**  
**FINA 4371 – 01 35189**

## **The Energy Value Chain**

**Fall 2008**

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The course provides an overview of energy economics. It applies economic concepts and analysis to understanding how and where value is created and where it is lost between obtaining raw materials and delivering energy to consumers as transportation fuel or electric power. Students will learn about the structure and operations of the transportation fuel and electric power value chains as well as how prices along the value chain are determined. The class will use that learning in considering several contemporary issues: the future availability of oil and gas, climate change, energy security, alternative fuels, economic development, regulation and the impact of financial market speculation.

Those working in the industry will find the course helpful in understanding where their activities fit into the overall energy picture and for assessing what the future is likely to hold. Those who expect to see energy businesses as customers, suppliers, clients, partners, or as investment or trading opportunities will gain understanding of the issues, opportunities and constraints confronting their counterparts. Students with a more general interest in applied economics or public policy will gain a better understanding of this critical part of the world economy.

The course also serves as introduction to two other energy economics course that deal in more depth with the upstream oil and gas industry and with refining and petrochemicals.

The instructor is D. H. Bellman. Prior to working with the Global Energy Management Institute, Professor Bellman spent thirty-five years at Exxon. He gained experience in a wide variety of functions, from acquiring raw materials, to plant operations, to sales. In the early 1990s he was Business Analysis and Strategic Planning Manager for Exxon Chemical's worldwide polymers businesses. Subsequently, he was Business Development Manager for the company's Global Polyethylene Business and involved in creating new joint-ventures, acquisitions, and investments in olefin and polymer complexes in East Asia, West Europe, Australia, Latin America, and the Arabian Gulf, as well as in the US. He earned a bachelor's degree in mechanical engineering at Duke University, and a master's degree in business administration at Stanford University.

## **Course Materials**

There is no required textbook for the course.

Lecture notes and other course materials will be available via WebCT or on the Internet.

## **Course Requirements**

Homework problems and cases to be discussed in class.

Three tests

A final examination question.

## **Class Schedule and Topics**

### **August 27**

- Course overview
- Some Concepts
  - ⇒ Value chains
  - ⇒ Economic rent
  - ⇒ Energy efficiency
- Energy budgets

Read: EIA International Energy Outlook Highlights

### **September 3**

- Homework discussion
- Commodity price determination

Preparation: Energy forecast homework

Read: Selection from EIA Energy Outlook  
Selection from "Well To Wheels Analysis"

### **September 10**

- Homework discussion
- Commodity price determination
- Evolution of the energy industry
- Introduction to climate issues

Preparation: "Texas Price Crash" homework problem

Read: Simmons, "An Energy History Lesson"

### **September 17**

- Price research discussion
- Greenhouse gases and climate change
- Review for test #1

Preparation: "Blame the French?" team research problem

Read: Selections from: IPCC, "Climate Change 2007"

Kakutani, "Al Gore Revisits Global Warming"

Tierney, "Feel Good Vs Do Good ..."

### **September 24**

- Test #1 (on material covered in first four sessions)
- Hydrocarbons
- Fossil fuel geology
- Fossil fuel exploration

Read: "Exploration History In Texas"

Petroleum Exploration Primer

### **October 1**

- Review and discussion of test #1 results
- Risk, uncertainty and exploration decisions
- Oil and gas reserves
- Future supplies of oil and gas
- Rise of the state oil companies

Read: Simmons, "Is the world supply of oil and gas peaking?"

CERA, "Peak Oil theory ... is faulty"

Maass in the New York Times, "The Breaking Point"

The Economist, "The bottomless beer mug"

Selections from National Petroleum Council, "Facing the hard truths about energy"

### **October 8**

- Production decisions and the value of information
- Oil and gas production
- "Peak Oil" Discussion
- Unconventional oil

Preparation: Team view on "Peak Oil" issue

Read: EIA Production Basics

The Economist, "Oil In Troubled Waters"

The Economist, "Oil's Dark Secret"

The Financial Times, "The New Seven Sisters"

### **October 15**

- Measuring value: Spreads and other tools
- Petroleum refining
- Petrochemicals
- Refining and chemical configurations and economics

Read: EIA Refining Basics

Terreson, excerpt from "The Long Cycle"

## October 22

- Homework discussion
- Petroleum logistics and marketing
- The midstream
- Biofuels
- Review for test #2

Preparation: Simpler World homework problem

Read: Allegro Group, "How Pipelines Make the Oil Market Work"  
Mandelson, "The Biofuel Challenge"

## October 29

- Test #2 (on material covered in the five previous sessions)
- Impact of financial speculation discussion
- Energy industry and its impact on economic development

Preparation: Team view on impact of speculation

Read: Berkowitz, "Market Speculation and Energy Prices"  
Dickard, "The Role of Speculation in Energy Markets"

## November 5

- Review of test #2 results
- Natural gas
- Coal
- Electric power generation and distribution

Read: Rosenberg, "The Perils of Petrocracy"  
Spalding, "The Economics of Gas Development in Saudi Arabia"  
The Economist, "The Paradox of Plenty"  
"The US Coal Industry In The 1990s"

**November 12**

- Evolution of the electric power industry
- Regulation of electric power
- Energy reliability and security
- The hydrogen economy
- Review for test #3

Read: EIA, "Electric Power Industry Overview"  
Hibbard, "U. S. Energy Infrastructure Vulnerability"

**November 19**

- Test #3 (on material covered in the three previous sessions)
- Re-regulation discussion
- Back to basics: The Sun?

**December 3**

- Review of test #3 results
- Impact of climate change concerns on the energy value chain
- Exam review

Preparation: Team view on climate change impact on the energy value chains

Read: