

# OPRE 6389 Managing Energy: Risk, Investment, Technology ( MERIT )

## Syllabus

### Course Information

Course number - section: OPRE 6389 - 501; Course title - term: Managing Energy - Spring 2015

### Professor and Teaching Assistant Contact Information

- Professor: Metin Çakanyıldırım , metin@utdallas.edu , SOM3.408.  
Lecture hours: 7-9:45 pm on W at JSOM.1.117.  
Office hours: 5-6 pm on T at SOM3.408.
- Teaching Assistant: Bharadwaj Kadiyala , bxx121930@utdallas.edu , SOM3.218.  
Office hours: ?-? pm on ?? at ??.

### Pre-requisites:

Elementary knowledge of calculus and probability, or consent of the instructor. MERIT can be taken by qualified junior/senior undergraduate students, e.g., fast-track or honor students.

### Course Description:

MERIT is designed for students or professionals interested in the energy sector. Energy sector houses applications from several academic disciplines: Operations Management, Engineering and Technology, Risk Management, Economics and Finance. Students currently involved in these and similar academic programs can take MERIT to learn the fundamentals of the energy sector. MERIT prepares such students and professionals for entry- to mid-level management careers in the energy sector.

MERIT has four modules: i) Resources, ii) Technology, iii) Transformation and Transportation, and iv) Procurement, Investment and Risk. These modules loosely correspond to the material covered by Energy Risk Professional (ERP) certification of Global Association of Risk Professionals. Hence, students upon completing MERIT will find it easier to pass GARP-ERP exam to obtain the certification. The next GARP ERP exam is on May 16, 2015; see <https://www.garp.org/erp>.

MERIT is not a pure macroeconomics course that studies aggregate demand and supply relationships in the energy sector. Nor is it a pure finance course that studies energy trading and associated financial instruments. Despite embracing principles from economics and finance, MERIT mainly aims to equip students with essential knowledge so that they can function successfully in an energy company.

The energy industry is growing at a rapid pace and needs qualified professionals. Employment prospects are fueled not only by the high-paced growth of the industry but also by an aging employee base, with up to half of the current workforce expected to retire over the next 5-10 years. Even relatively young professionals can benefit from updating and retooling their skills in the face of important industry developments, including hydraulic fracturing, emergence of new fields and associated logistics challenges, oil-gas price decoupling, smart grids, renewable energy resources and tightening environmental regulations. Home to over 500 energy companies, the Dallas/Fort Worth metroplex can provide many employment opportunities in the energy industry for graduate degree holders.

### Course Objectives:

1. To discuss a range of topics related to energy:
  - (a) To acquire energy terminology and to be aware of energy issues.
  - (b) To learn new technologies for generating/finding energy and distributing it.
  - (c) To appreciate the challenge and creativity associated with managing energy investments and risk.
  - (d) To understand how energy affects business, people, society and environment.
2. To learn about challenges related to technology, investment and regulation, and discuss potential solutions.

### Required Materials:

- **Textbook: Electricity Markets: Pricing, Structures and Economics.** By Chris Harris.
- **Case Study: “Coal, Nuclear, Natural Gas, Oil, or Renewable: Which Type of Power Plant Should We Build?”**, by Gary Clendenen, Paul W. Thurston, Fang Zhao, Stephen M. Kidwell. Harvard Business Publishing Case # NA0007-PDF-ENG, Jan 15, 2010. Also appeared in North American Case Research Association’s [www.nacra.net](http://www.nacra.net) Case Research Journal, Vol.30, Iss.3.
- **Case Study: “Risk Management at Apache”**, by Lisa Meulbroek and Puja Malhotra. Harvard Business Publishing Case # 9-201-113, revised on Aug 27 2001. HBS 201113-PDF-ENG.

### Supplementary Books - under development:

- Optimal Supply Chain Management in Oil, Gas, and Power Generation. By David Jacoby. First edition published by PennWell Corporation in 2012. Available from <http://www.pennwell.com/publications.html> and from [www.amazon.com](http://www.amazon.com).
- Nontechnical Guide to Petroleum Geology, Exploration, Drilling and Production. Third edition in 2012. By Norman J. Hyne. Published by PenWell Corporation.
- Fundamentals of Oil and Gas Accounting. By C. Wright and R. Gallun, PennWell 2008.
- Oil, Gas Exploration and Production. 2007. By Institut Francais du Petrole.
- Managing Energy Risk: An Integrated View on Power and Other Energy Markets. By M. Burger, B. Graeber and G. Schindlmayr, John Wiley & Sons 2007.
- Fundamentals of Power System Economics. First edition in 2004 corrected in 2010. By Daniel Kirschen and Goran Strbac. ISBN 13: 978-0-470-84572-1.
- Energy Trading and Investing. By D.W. Edwards, McGraw-Hill 2010.
- Energy Risk: Valuing and Managing Energy Derivatives. By D. Pilipovic, McGraw-Hill 2007.
- Competitive Electricity Markets. 2008. Ed. by Fereidoon P. Sioshansi. ISBN 13: 978-0-080-47172-3.
- **“The Energy Report”**, by S. Combs, Texas Comptroller of Public Accounts, 2008.  
<http://www.window.state.tx.us/specialrpt/energy>
- **“Texas Power Challenge”**, by S. Combs, Texas Comptroller of Public Accounts, 2014.  
<http://www.window.state.tx.us/specialrpt/electricity/96-1767.pdf>

### Assignments & Grading Policy:

- Classes start on Jan 14 and ends on April 29. Spring break is March 16 - March 21, so no class on March 18. Students are advised to attend the classes.
- Grading
  - 5%: Class attendance and contribution to discussion.
  - + 20% \* 3 Quizzes: Four quizzes will be administered after the completion of the associated module. The lowest quiz grade will be dropped from consideration.
  - + 10%: One case report for “Coal, Nuclear, Natural Gas, Oil, or Renewable” or “Risk Management at Apache”.
  - + 25% \* Project: Students will choose an energy related topic / issue on their own or from suggested ones, and prepare a written report. The report can include a description of a process, an analysis of an issue, a rebuttal of a widely accepted claim, interaction of energy issues with geopolitics, society, economy. The project can be done in groups of 3-5 students. Before writing the report, each group will submit a 1-page summary of the project before the Spring break (March 11). The reports should be at most 20 pages and are due to the next to last class (April 22). The last class (April 29) is devoted to project presentations. Each presentation should last about 20-25 minutes and can be done by one, some or all of the group members. 15% of the grade is from the report and 10% is from the presentation.
- In this course, you will be given +/- minus grades. For example, you may get an A- or B+ grade. Students earn a grade in this course by mastering the course material. Students are not graded based on any type of need, amount of effort, family, personal circumstances, or their previous record in other courses.

## UTD Resources

- Practice Lecture Series: We expect to host 1-2 lectures in class. They will be on Energy Sector and be given by practitioners from Dallas area companies. Lecture dates will be announced later on the course web site.
- Blog: Global Energy Digest <http://globalenergydigest.blogspot.com> written by UT-Dallas Prof. Anastasia Schcerbakova.
- UT-Dallas Student Organization: Energy Association, contact Hazem Elshorbagy [hxe140430utdallas.edu](mailto:hxe140430utdallas.edu).
- Relevant UTDallas Centers: International Center for Decision and Risk Analysis (ICDRiA) performs interdisciplinary research and develops cooperation in risk management and decision-making by exchanging knowledge and experience among academia, industry, and public agencies. For more info: <http://som.utdallas.edu/icdria>. Also see <http://mgmt.utdallas.edu/c4isn> for Center for Intelligent Supply Networks (C4ISN).
- E-Access to Journals via UTD Library: Library electronically subscribes to many journals such as Harvard Business Review, Management Science, which are of interest. To access such a journal go to the UTD Library web page. Click on "E-Journals". You will see an alphabetical list of journals. Click on "H" for "H"arvard Business Review. You will see that HBR is listed 15-20 from the top among the journals starting with letter "H". Click on HBR link, you will be transfered to EBSCO web site which keeps the journal. To access from a non-UTD computer, you need UTD ID and password. Please respect the copyright laws.
- Career Center: The SOM Career Center (<http://som.utdallas.edu/somResources/somCareerCenter>) provides the following services: Career Counseling, Resume Assistance, Interview Assistance, Job Search Assistance, Career Resource Library, Web Resume Database, On Campus Recruiting, Active Internship Program.

## Web Pages

Course webpage accessible from [www.utdallas.edu/~metin/teaching.html](http://www.utdallas.edu/~metin/teaching.html) with the password .....

## Tentative Course Modules and Topics

**Module 0: Introduction and Overview.** 0.5 Lecture: 0.5\*Jan 14.

**Module 1: Resources.** 3.5 Lectures: 0.5\*Jan 14, 21, 28, and Feb 4.

Nonrenewables:

Hydrocarbon geology

Oil

Gas

Coal

Nuclear

Feb 4 at 8:30 pm. **Quiz 1**

**Module 2: Technology.** 3.5 Lectures: Feb 11, 18, 25, and 0.5\*Mar 4.

Renewables: Wind, Solar, Hydro, Storage.

Enhanced Oil and Gas Recovery.

Regulations.

Feb 25. **Case Study: “Coal, Nuclear, Natural Gas, Oil, or Renewable”.**

Mar 4 at 7:00 pm. **Quiz 2**

Spring Break: March 16 - March 21 ⇒ No class

**Module 3: Energy supply chain: Transformation & Transportation** 3 Lectures: 0.5\*Mar 4, 11, 25 and 0.5\*Apr 1.

Transformation:

Oil refining.

Electricity generation.

Transportation:

Pipelines.

(Smart) Grid.

Apr 1 at 7:00 pm. **Quiz 3**

**Module 4: Procurement, Investment and Risk.** 3.5 Lectures: 0.5\*Apr 1, 8, 15, 22.

Markets: wholesale, retail, spot, forward.

Contracts, swaps and options.

Risk and investment.

April 22. **Case Study: “Risk Management at Apache”.**

Apr 22 at 8:30 pm. **Quiz 4**

Apr 29. Project Presentations. 1 Lecture.