

FIN 4313: Energy Finance

Spring 2017

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Class: FIN 4313, T 1:00 - 3:45 PM, JSOM 2.804
Prerequisites: FIN 3320
Office Hours: by appointment

Course Description

This course focuses on the issues associated with investing in and financing energy projects, as well as managing energy risks. Case studies are drawn from the oil, natural gas, electricity and renewables sectors.

Course Objectives

This course combines energy finance (valuation of energy assets and companies) with project financing techniques (off-balance sheet, non-recourse financing arrangements) to teach students how to

- Evaluate and quantify financial potential of energy companies, assets, and projects
- Ethically and effectively manage risks common in energy investing
- Negotiate financing for new energy deals

Textbooks

John D. Finnerty, *Project Financing: Asset-Based Financial Engineering*, 3rd Edition, John Wiley & Sons, Hoboken, NJ 2013. ISBN: 1118394100

The following sources may be helpful in improving understanding of specific concepts covered in class.

1. *Energy Finance and Economics: Analysis and Valuation, Risk Management, and the Future of Energy*, Edited by Betty J. Simkins and Russel E. Simkins, John Wiley & Sons, Hoboken, NJ 2013. ISBN: 978-1-118-01712-8
2. *The Wall Street Journal*
3. *The Economist*

Grading Policy

Your grade in this class will be based on successful completion of an energy financing project, similar to those you would be expected to work on if you were employed by an energy company.

Project description:

You are hired on a consultancy basis by Shell's global LNG division. The company is looking into three potential sites for a natural gas liquefaction project and needs your help determining which of the three sites has the best financials. Your job will be to a) run the financials on each of the three options, b) present the outcomes of your analysis to a team of company executives, and c) make an investment recommendation.

Given the significant scope of the project, you will work in teams of two students. Each team will be randomly assigned one of three sites to be evaluated. Your evaluation will need to account for the site's productive potential, timing of development, local fiscal and tax regimes, best export markets, appropriate pricing structures, and any financing constraints you may encounter. Due dates for different stages of your analysis are listed in the schedule below.

Project due dates:

Note: late submissions will be penalized at a rate of 25% per calendar day.

1. Jan 30 - production schedule
2. Feb 13 - volumes delivered to liquefaction plant and tanker
3. Feb 27 - market selection pricing formulas
4. Mar 20 - shipping options and costs
5. Apr 17 - after-tax profits, project NPV, total and annual ROIs, and project life
6. Apr 25 - final investment recommendation and presentation to company executives

Each submission should include an Excel file with your detailed calculations and one or two (but not more than two) PowerPoint slides summarizing your Excel results.

Grade breakdown:

Project (each of the six components is worth 15%)	90%
Class participation	10%

Notes on the Calendar

Note: there will be no class on March 14, 2017 (spring break).

Last day to Withdraw **without** a "W" is Wednesday, January 25. Last day to Withdraw **with** a "W" is Monday, March 27.

For more information, consult the academic calendar at
<http://www.utdallas.edu/academiccalendar/files/AcademicCalendarSpring2017.pdf>

eLearning

Electronic versions of course materials will be posted on eLearning (elearning.utdallas.edu). Please check the course site regularly for updates and announcements.

Course Outline

Introduction to energy financing

- Historical perspective on energy project funding
- What distinguishes energy projects
- What distinguishes project financing from corporate finance

Readings:

- ▶ Finnerty, Chapters 1-3

Structuring a project financing plan

- Selecting an appropriate project structure
- Finding sources of capital
- Structuring security arrangements
- Negotiating supply agreements and off-take contracts
- Supplemental credit and bridge financing
- Insuring against risks
- Case study: Texas wind power

Readings:

- ▶ Finnerty, Chapters 4,5,7-9
- ▶ Benjamin Etsy, “Petrozuata: a case study of the effective use of project finance”

Financial statement analysis

- Oil and gas accounting

Readings:

- ▶ Simkins, Chapters 8,9
- ▶ James Smith, “Valuing Barrels of Oil Equivalent”
- ▶ Ernst & Young, “US E&P benchmark study”, June 2012

Discounted cash flow analysis

- Projecting cash flows
 - Oil and gas price formation: benchmarks, reserves, supply and demand, inventories, trading locations, geopolitical risk
 - Electricity price formation: locational pricing, supply-demand balancing, basis (congestion/curtailment costs, liquidity risk), intermittency risk

- Preparing financial statements
- Evaluating debt capacity
- Estimating cost of capital
- Sensitivity analysis

Readings:

- ▶ Finnerty, Chapters 10,11
- ▶ Argus Methodology and Specifications Guide: Argus Crude, Argus Sour Crude Index, Argus Americas Crude
- ▶ Platts Methodology and Specifications Guide: Crude Oil

Financing conventional and renewable energy projects

- Environmental analysis
- Contracts, independent engineer certifications, and resource validation
- Sources of financing (construction debt, permanent debt, bridge financing, vendor financing, sponsor equity, tax equity, EB-5, etc.)

Readings:

- ▶ Finnerty, Chapter 6
- ▶ Sharif et al., “The return - and returns - of tax equity of US renewable projects,” Bloomberg New Energy Finance whitepaper, November 21, 2011
- ▶ Keith Martin, “Lessons from the last rush to start construction,” Chadbourne special update, December 17, 2014
- ▶ European Wind Energy Association, “Where’s the money coming from? Financing offshore wind farms,” November 2013
- ▶ DBRS, “Rating wind power projects,” January 2014

Financial risk management for energy projects

- Ethics in risk management
- Options and futures, swaps, etc.
 - Hedging exercise
- Real options analysis
- Economic diversification and political hedging
- Managing price, regulatory, environmental, transmission, equipment, and other risks

Readings:

- ▶ GARP Code of Conduct
- ▶ CME Group, “Introduction to crack spreads”

- ▶ Simkins, Chapter 11: Real Options and Applications in the Energy Industry
- ▶ Ryan Kellogg, “The effect of uncertainty on investment: evidence from Texas oil drilling,” American Economic Review, Vol. 104(6), pp. 1698-1734
- ▶ James Smith, “The option to hold a petroleum lease by production: a user’s guide to the shale gas drilling boom,” November 28, 2014

UT Dallas Syllabus Policies and Procedures

All students enrolled in the course are expected to abide by the academic standards set forth by the University. Details of academic standards and other University policies and procedures can be found at <http://go.utdallas.edu/syllabus-policies>.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.