Energy Markets and Innovation
Fuqua School of Business, Duke University
Spring 2019, Session I

Mon & Thu, 9:00 am – 11:15 am
Rand Classroom

Prof. Lincoln Pratson
3119 Environmental Hall
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TA: Sarah Van Vleet, Fuqua
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Course Description
This course will use recent case studies to explore how ongoing changes in energy supply, demand, and technology are affecting energy markets and the businesses that operate within them. The specific transformations that will be explored include shale gas and shale oil, renewable power generation, energy efficiency retrofits in buildings, and recent government environmental regulations/incentives. Changes in these areas will be analyzed in terms of business strategy, investment, and stakeholder engagement, as well as in terms of broader market dynamics. The course will emphasize business opportunities/challenges in U.S. energy markets, but because these are tied to international markets, the latter will also be considered where relevant.

Energy Markets & Innovation (EMI) complements but is independent of Energy & Environment (E&E), a course offered through the Nicholas School (ENV 711). The E&E course provides a broad, relatively comprehensive overview of how the current energy system works and ways that it is evolving towards a more environmentally sustainable future. EMI considers a number of issues discussed in E&E, but from the standpoint of how these issues are affecting businesses that provide or use considerable amounts of energy.

General Aim
This course aims to familiarize you with critical markets and businesses within the overall energy value chain and give you exposure to using energy data in developing business strategy and/or evaluating potential investments stemming from ongoing transitions in the energy industry.

Specific Objectives
By the end of this course, I expect you to be able to:

• Recognize how changes within an energy sector may be affecting enterprises within that or other sectors.
• Assess energy-investment options using basic economic/business analytical tools such as cash flow models.
• Factor different stakeholder viewpoints into business decisions regarding energy production or use.
• Understand how government environmental regulations/incentives can affect the cost-competitiveness of different energy investments.
Method of Assessment

The distribution of the grades for the class will follow Fuqua’s recommended policy for elective classes with no more than 30% SP, 45% HP, and at least 25% P or lower. Grades will be based on class participation and case assignments (both described below) as follows:

- Class Participation: 20%
- Team Case Assignments (4): 40%
- Individual Mid-term Case Assignment: 15%
- Individual Final Case Assignment: 25%

Class participation: Given the Fuqua philosophy of a “learning partnership”, I expect that you will attend class regularly and on time, having prepared beforehand all cases, assignments and readings. I expect that you will be actively involved in class discussions, including asking questions and sharing your knowledge and experiences with the class. I reserve the right to cold call any student at any time in the class and may take attendance as part of the participation grade. If you have to miss class because of an emergency or an unavoidable conflict, please let me (and if applicable your team) know as soon as possible, preferably in advance of class.

Case Assignments in General: Cases and class discussions are the most important aspects of this course. In general, the selected cases describe how a recent change in the energy market has created ambiguities and/or uncertainties for a firm that must make an important business decision. We will evaluate and discuss the firm’s options in class. To stimulate your thinking prior to our discussion, you will be tasked with providing information critical to the firm’s decision or a recommendation on what the firm should do. Case question(s) will be posted on Canvas by 11:30AM on Thursdays, one week before the case assignment is due. You are expected to read the case ahead of the next class and work through the question(s) for the case assignment to the best of your or your team’s ability.

All case assignments are graded and must be submitted electronically by 8:50AM on Thursdays, the day assignments are due, except for Case 6, which will be due by 11:55PM on Friday, March 1. For all case submission deadlines, late assignments will receive a grade of zero. Please bring a printed copy of your assignment to class so that you can refer to it during our class discussion. The TA and/or I will provide you with your grade and brief feedback on your assignment before the next one is due (see Case Assignment Grading below).

Write-ups should be in the form of a one-page memo plus any supporting tables and calculations (pasted into the same document after – not within – the text); the latter must be explicitly referred to in the memo in order to be considered. Please type your memo single-spaced with a minimum of 11-point font and one-inch margins. Please do not include a cover sheet but do include you and your team members’ names plus the case assignment number at the top of the memo.

At a minimum, your memo must address the specific question(s) for each case posted on Canvas. Some questions will require numerical calculations, but your qualitative analysis is the important aspect of the assignments. Your analysis should identify key issues, suggest alternative actions, and, where appropriate, take a position that is supported and reasoned using case data. You should envision the recipient of the memo to be a senior level manager.
Your analyses should be clear, concise, and direct, with nothing left to the reader’s imagination. The TA and I will not draw inferences from your analyses, hence recommendations should be clearly laid out and assumptions embedded in the analysis must be explicit.

**Case Assignment Grading:** Assignment grades will be based on *Sarah’s and my opinion* of the soundness of your analysis and clarity of your exposition, with the quality of your analysis counting more than the accuracy of your answers to any calculations. Our grading will also factor in how your analysis ranks in quality with respect to the analyses submitted by the rest of the class.

**Team Case Assignments:** These are to be completed with only members of your study team (see *Team Formation* below). One member needs to submit your team’s write-up, via the “Assignments” page on *Canvas*. All team members will then receive, via *Canvas*, the team’s grade and any brief feedback on the team’s submission.

*Team Formation:* The class is to subdivide into self-selected teams of five by 5PM Tuesday, January 22. Team formation should factor in diversity and I would like at least two Fuqua students on each team. There will be a page on *Canvas* for registering your teams.

Teams will remain unchanged through the Term. I will assume that team members are satisfied with each other’s work on the assignments unless I receive a complaint from one or more members about others’ contributions. In that case, I will have the team fill out a peer evaluation and use the feedback to adjust everyone’s grades based on my assessment of the situation.

**Individual Case Assignments:** These are to be carried out exactly like the team assignments but are to be done alone. You are not permitted to discuss the case or ask questions about it with anyone.

The individual case assignments are *Cape Wind: Offshore Wind Energy in the USA* (due 2/14/19), and *A123 Systems: Power. Safety. Life.* (due 3/1/18).

**Course Materials**

- **Coursepack:** Contains the six (6) business case studies that will be analyzed in this course. The coursepack can be purchased Jan 18-19 at the Fuqua Building Management Office (BMO). After that, the coursepacks will be available through Laurie Kennedy at the BMO.
- **Additional Readings:** These, if any, will be added to *Canvas* as the course proceeds. Readings required for a class will be made available at least one class before they are to be read (e.g., a reading assignment due on a Thursday will be posted on *Canvas* on the Monday beforehand). Readings suggested for further reference during class (i.e., they are not required) will posted immediately after class.
- **Reference Texts:** The following texts provide excellent overviews of the markets for oil, gas and electricity, and have been put on reserve in the Ford Library:
  - *The Quest*, by Daniel Yergin
  - *Understanding Today’s Electricity Business*, by Bob Shively and John Ferrare
  - *Understanding Today’s Natural Gas Business*, by Bob Shively and John Ferrare
  - *Oil 101*, by Morgan Downey
- **Reference Online Material:** I have made two energy industry Massive Open Online Courses (MOOCs). One is on the oil & gas industry while the other is on the electric
industry. Both provide a fairly thorough introduction to these industries if you are unfamiliar with them. Links to the course are here:

- *Oil & Gas Industry Operations & Markets*
- *Electric Industry Operations & Markets*

**Office Hours**
- 10:00A-12:00P Fridays, Office No. 3119 Environment Hall.

**Non-Office Hours**
My experience is that students often prefer to ask questions via email. I will try and be as responsive to such queries as I can, but like you, I have a number of other things going on and am extremely busy. Please note the following:

- Do not expect an email response from me after C.O.B. or over weekends, as this is family time.
- If your question requires an extended response, I may request that you either see me during my office hours, set up a time to talk on the phone, or possibly even meet before class in the Fox Center on M&Th.

**TA**
I feel very fortunate to have Sarah van Vleet as the course TA this year. Sarah was a top performer in the EMI class last year. Sarah is well versed with the course materials and assignments. She will be responsible (1) for helping you understand the concepts in the case studies, and (2) for grading your assignments. Sarah can answer questions by email or by appointment. You can reach her by email at sarah.van.vleet@duke.edu.

**The Classroom**
- This class will follow the established *Fuqua Classroom Norms* (the Student Liaison for this class is Angela Tenney).
- Please bring a calculator and a laptop to class for use during and only during specified in-class exercises.

**Fuqua Honor Code**
The Fuqua School of Business Honor Code ([http://www.fuqua.duke.edu/about/honor_code/](http://www.fuqua.duke.edu/about/honor_code/)) applies to all aspects of this course. The nature of each assessment indicates the type of communication and consultation that is permitted. I have described above specific forms of communication and consultation that are permitted in specific assessments. More generally, work that is prescribed as an individual effort is to be your work alone, without consultation or assistance from any other person. Work that is prescribed as a team effort is to be your team’s effort alone, again without consultation or assistance from anyone else, including former students. If you are uncertain about what you can or can’t do in preparing an assessment submission, please ask me in advance.

**Syllabus Caveat**
I understand that you expect that we will cover the course topics stipulated in this syllabus and that you will use it to schedule your time throughout the Term. Therefore, I will not change this syllabus unless it necessary. Any such revisions will be announced in class and, if needed, an updated syllabus will be posted on *Canvas*. Students will be held responsible for all changes.
**Course Calendar At-A-Glance**

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<th>Class</th>
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<th>Topic</th>
<th>Exercise/Case Assignment Due Date</th>
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<td>Thu, 1/17/19</td>
<td>Course Overview and Preview of Cases</td>
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<td>Tue, 1/22/19</td>
<td>Gas (and Oil) Price Volatility</td>
<td>Energy Efficiency Investment Exercise</td>
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<td>3</td>
<td>Thu, 1/24/19</td>
<td>Recovering from Growing Too Fast</td>
<td>Newfield Energy, HBS (9-914-541, 2/25/2014)</td>
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<td>Mon, 1/28/19</td>
<td>Refinery Profit Optimization</td>
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<td>5</td>
<td>Thu, 1/31/19</td>
<td>A U.S. Refiner’s Opportunities</td>
<td>Valero Energy Corporation and Tight Oil, HBS (9-713-083, 6/21/2013)</td>
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<td>Mon, 2/4/19</td>
<td>Power Plant Economics</td>
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<td>Thu, 2/7/19</td>
<td>Selecting Which Type of Power Plant to Build</td>
<td>Coal, Nuclear, Natural Gas, Oil, or Renewable: Which Type of Power Plant Should We Build, North American Case Research Assoc. (NA007, 2010)</td>
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<td>Wind Energy</td>
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<td>Siting Wind Farms</td>
<td>Cape Wind: Offshore Wind Energy in the USA, HSB (9-708-022, 5/19/2008)*</td>
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<td>Solar Energy</td>
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<td>Financing Solar Power</td>
<td>REI’s Solar Energy Program, Stanford (BE-17, 12/2/2011)</td>
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<td>Buildings &amp; Energy Efficiency</td>
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*Case to be done on your own.*