

## SYLLABUS

**Course: Shale Gas & LNG – Spring 2018**

**Time:** 1:00p-4:00p Fri (1/26, 2/23, 3/23, 4/20)  
10:00a-1:00p Sat (1/27, 2/24, 3/24, 4/21)

**Location:** TBD

**Professor Susan L. Sakmar**

[susansakmar@globalgaslaw.com](mailto:susansakmar@globalgaslaw.com)

[www.susansakmar.com](http://www.susansakmar.com)

Twitter: @SusanSakmar

Cell: 415-272-4691

Office Hours: TBD or by appointment

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### **COURSE OVERVIEW**

This course explores the myriad of legal, policy and environmental issues pertaining to global natural gas markets, with a particular focus on global shale gas development and the development of LNG import and export projects around the world, including recent developments in US LNG export projects. According to the International Energy Agency (IEA), a “major transformation” of the global natural gas markets is underway, primarily driven by new supplies coming from the United States. We will explore the dynamics behind this transformation throughout the semester and students will have the opportunity to explore a natural gas topic of their choice through their research paper.

The first half of the semester will explore the growing role natural gas is expected to play around the world in the context of a number of competing drivers, such as increased energy demand, environmental concerns, and energy security. Our focus will be on the US shale gas “revolution”, which by most accounts is a “game changer” that could be replicated around the world so long as the right regulatory and environmental frameworks are put in place. This course will explore the existing regulatory and environmental frameworks for shale gas, especially those in the United States, as well as frameworks being developed around the world.

The second half of the semester will explore the growing role LNG is expected to play as the “glue” linking global gas markets. Our focus will be on US LNG exports, which could usher in a “second revolution” in the global gas markets. The course will also explore the opportunities and challenges for various LNG import and export projects around the world in the current contextual reality wherein energy law and policy are increasingly intersecting with environmental law and geopolitics.

**Book Requirements:** Susan L. Sakmar, **Energy for the 21st Century: Opportunities and Challenges for Liquefied Natural Gas (LNG) (2013)**. The book is available for direct purchase from [www.amazon.com](http://www.amazon.com) or the publisher [www.e-elgar.com](http://www.e-elgar.com). (ISBN-13: 978-1782544234 ISBN-10: 1782544232) The book is available in paperback from the publisher (a less expensive option) and is also available as a Google eBook.

**Other Materials:** Most materials will be available online for download and/or will be distributed in class.

**Grades:** The final grade will be weighted as follows:

50% - Research paper (due at end of semester)

50% - Research assignments, class participation, current events and attendance.

**Research Paper:** Each student will write a 15-page (max) term paper on a topic related to global gas markets. Students are free to develop a topic of their choice subject to professor approval. Students will submit an outline of their paper and will identify their paper topics to the class mid-semester.

**Class discussions:** Class participation in the seminar is both necessary and mandatory. Students are expected to complete assigned readings and be prepared for class.

**Current events:** Each student is required to turn in a “current event” news article relevant to some aspect of global gas markets every week or as assigned. Time permitting, several students will present their current event to the class each week.

**Research assignments:** Several written research assignments will be assigned throughout the semester. These assignments require independent research to answer the questions posed in the assignment. Students are required to turn in these written assignments (2-4 pages) each class or as otherwise instructed.

**The 1<sup>st</sup> Research assignment can be downloaded from the course website. Other research assignments will either be handed out to students at class and/or posted on-line for students to download.**

## **1. SHALE GAS DEVELOPMENT (First half of semester)**

### **Overview of US and Global Shale Gas Development**

The development of unconventional or shale gas in the United States has significantly altered the global energy supply assessment. Since shale rock exists in almost every corner of the world, developments in the American shale gas industry are being closely watched as other countries begin to explore the extent of their own unconventional resources. The interest in shale gas development is likely to continue as industry, governments, and policymakers search for ways to meet growing energy demand with cleaner-burning fuels. While the potential for global shale gas development is significant, the industry faces a number of commercial, regulatory and environmental challenges. The course will cover these issues in as much detail as possible and students will have the opportunity to explore a topic of interest in further detail in their research papers.

Topics to be covered in the course include:

- History and evolution of the shale gas industry – what is shale gas?
- Identify the key environmental issues related to hydraulic fracturing and shale gas development as well as the regulatory responses to these issues.
- Identify the key water-management issues related to hydraulic fracturing, including water acquisition, use, reuse, and disposal.
- Analysis of the key regulatory frameworks for U.S. shale gas development including focused discussion on key shale producing states such as Texas and Pennsylvania.
- What is the potential for shale gas development globally?
- Which countries are actively pursuing shale gas development and which countries have the most potential? What are the issues and challenges?
- Analysis of regulatory frameworks that are emerging for global shale gas

development.

## 2. THE ROLE OF LNG IN GLOBAL GAS MARKETS (Second half of semester)

The second half of the semester will explore the growing role liquefied natural gas (LNG) is expected to play as the “glue” linking global gas markets. LNG is natural gas that has been cooled until it reaches a liquid state, which then allows it to be shipped around the world. As a direct result of the US shale gas “revolution,” the US has now emerged as a major exporter of LNG, with wide ranging consequences for global gas markets. What was once a niche market with very few players, LNG is now one of the fastest growing segments of the energy sector.

Topics to be covered in the course include:

- The entire LNG value chain, including a discussion of the liquefaction process, LNG shipping, and the regasification process.
- The evolution of LNG markets including the history of LNG and an overview of the three major LNG markets.
- A description and overview of key LNG supply projects around the world.
- The primary markets driving LNG demand around the world.
- LNG contracts and trade including whether the increased globalization of LNG will lead to LNG trading as a global commodity.
- Safety and environmental issues related to the construction of LNG terminals.
- The prospects for US LNG exports and why the US is seen as the catalyst for dramatic change in the international gas market.

### COURSE SCHEDULE AND ASSIGNMENTS

#### Part 1A Course Overview, Global Gas Markets, and Shale Gas Overview

##### Session 1

**Jan. 26 & 27**      **Read LNG Book:** LNG Book Chapters 1, 2 & 10

These first reading assignments discuss the role of natural gas (shale gas and LNG) in the global energy mix and are important to provide a foundation for class discussions throughout the semester.

**Assignment Due**      Research Assignment 1 due Jan 26 – be prepared to discuss.

**Current Events**      Bring a current article on some aspect of shale gas development and be prepared to discuss and turn in the article.

#### Part 1B Shale Gas - Regulatory Frameworks and Environmental Issues

##### Session 2

**Feb. 23 & 24**      **Read LNG Book:** Re-read Chapter 10 (shale gas)

**Assignment Due**      Research Assignment 2 due Feb 23 – be prepared to discuss.

**Current Events** Bring a current article on some aspect of shale gas development and be prepared to discuss and turn in the article.

**Part 2** **THE ROLE OF LNG IN GLOBAL GAS MARKETS**

**Session 3**

**March 12-17** **UHLC Spring Break**

**Mon. March 19** **PROPOSED PAPER TOPIC and SHORT OUTLINES DUE BY MONDAY, MARCH 19.** (Due via email and may be turned in anytime before March 19.)

**March 23 & 24** Read: LNG Book Chapter 2 (LNG Value Chain)  
Read: LNG Book Chapters 3 & 5 (LNG Demand)  
Read: LNG Book Chapter 6 (Contracts & Trading)

**Assignment Due** Research Assignment 3 due March 23 – be prepared to discuss.

**Current Events** Bring a current article on some aspect of LNG and be prepared to discuss and turn in the article.

**Session 4**

**April 20 & 21** Read: LNG Book Chapter 4 & 8 (LNG Supply)  
Read: LNG Book Chapter 12  
Read: US LNG Export reading TBD

**Assignment Due** Research Assignment 4 due April 20 – be prepared to discuss.

**Current Events** Bring a current article on some aspect of LNG and be prepared to discuss and turn in the article.

**April 27** Last day of classes

**April 28-May 10** Reading days and finals. **\*\* There is NO final for this class \*\***

**MAY 10** **PAPERS DUE BY 3:00 p.m.**  
Turn in details TBD but a hard copy and emailed copy are required.

**(See next page for paper guidelines and counseling services)**

**Paper Guidelines (more details will be provided in class)**

**Length:** 15 pages total (Including footnotes but does NOT include title page, abstract, table of contents or Appendix).

**Format:** 11 or 12 pt font for main text - double-spaced between paragraphs, single-spaced between text. 9 or 10 pt font for footnotes – single-spaced. Page numbers at lower right.

**Citations:** Bluebook (or similar style manual)

**Footnotes:** Footnotes (not endnotes)

**The UH Provost's office has asked the administration of all academic units to require faculty to add the following language to their syllabus relating to counseling and psychological services.**

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to the demands of a professional program, or feeling sad and hopeless. You can reach CAPS ([www.uh.edu/caps](http://www.uh.edu/caps)) by calling [713-743-5454](tel:713-743-5454) during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus.

[http://www.uh.edu/caps/outreach/lets\\_talk.html](http://www.uh.edu/caps/outreach/lets_talk.html)