

The Energy Value Chain - FINA 4371/7371 – Fall 2023

Class Information

- Wednesdays 6:00pm-9:00pm : beginning August 23, 2023

Instructor

Andrew Slaughter has taught energy-related courses at the University of Houston since August 2020, following a career in energy in Europe and North America. He has held management positions at major oil companies and with leading consulting and advisory firms. Andrew has also played a prominent role in industry research and policy advisory programmes for the US government. Most recently Andrew was Executive Director of the Research Center for Energy and Industrials with Deloitte Services LLP, in Houston. He started his career at Chevron Oil in the UK.

Summary

This course is designed to introduce students to the fundamentals of energy value chains, from energy production to energy use, including an understanding of the role of different forms of energy, market structures, investment dynamics and the evolving nature of the energy system. The course will cover oil and gas, electric power and renewable energy, including consideration of broader issues affecting energy such as the economic environment, climate change and sustainability.

Course Objectives

- Understand the current US and global energy market structure and its component value chains
- Understand how and why the energy value chains have evolved in the past, how and why they are likely to evolve in the future
- Understand the relationships between energy value chains and broader economic, policy, sustainability and societal trends
- Develop the ability to read, discuss, understand, analyse and present in written and verbal material issues affecting energy value chains and markets

Course Approach

The course will include a variety of learning activities including lectures, classroom discussions, case studies and individual and team projects.

Materials

Textbook: No required textbook

Case Studies:

- “Carbon Engineering”
- “ReNew Power: Leading the Energy Transition in India”
- “Digital Energy: Disruption in the Electrical Energy Market”
- “The US Shale Revolution: Global Rebalancing?”
- “ENGIE: Strategic Transformation of a Global Energy Conglomerate”

These case studies should be obtained using the following link, at a cost to each student of \$4.25 per case:

<https://hbsp.harvard.edu/import/1072943>

Grading

Grades will be based on a combination of in-class quizzes, based on the assigned case studies, an individual student research paper, and a team presentation project. Quizzes, the individual paper and the team project will each count for one-third of the final grade.

Class Topics

Date	Topic
August 23	Introductions; Course overview and expectations; Introduction to critical concepts of energy and energy value chains; introduction to key drivers of the global energy system
August 30	Energy markets supply and demand structure, trends and main drivers
September 6	Climate, Sustainability and ESG – implications for energy value chains <i>Case Study – Carbon Engineering – quiz and discussion</i>
September 13	Electric Power and Renewable Energy (1)
September 20	<i>Case Study – ReNew Power: Leading the Energy Transition in India” – quiz and discussion</i> Electric Power and Renewable Energy (2)
September 27	Electric Power and Renewable Energy (3) Coal
October 4	<i>Case Study – Digital Energy: Disruption in the Electrical Energy Market – quiz and discussion</i> Introduction to Oil and Gas
October 11	Oil and Gas – Upstream
October 18	<i>Case Study - The US Shale Revolution: Global Rebalancing? – quiz and discussion</i> Oil – Midstream and Downstream
October 25	Transportation Fuels and the Future of Mobility; Hydrogen
November 1	<i>Case Study – ENGIE: Strategic Transformation of a Global Energy Conglomerate – quiz and discussion</i> Natural Gas – Midstream and Downstream
November 8	Class time available to finalise team project presentations, no formal instruction
November 15	Team project presentations
November 30	Team project presentation (2 – if needed)
Final exam	None

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Project Assignments

Projects	Topic	Description	Deliverable
Individual	Research essay on changes in the structure of energy markets and energy value chains between the 2018-2022 period and what you expect for the 2023-2027 period.	Students will assess qualitatively and quantitatively the changing dynamics of energy markets and value chains between the two time periods focusing analysis on either 1) the world; 2) the USA; 3) China; or 4) the EU	10-15 page white paper (~5000 words)
Team	Value chain drivers	Student teams will select one energy value chain and analyse the main drivers for growth, investment and structural change, supported by data, evidence and credible outlooks	12 minute presentation by each team, followed by group Q&A