OIL AND GAS UPSTREAM INDUSTRY:
BUSINESS, STRATEGY AND FINANCE

Teachers: Nadine Bret-Rouzaut, Arash Farnoosh
Academic Year 2017/2018: Spring semester

BIOGRAPHICAL INFORMATION

Nadine Bret-Rouzaut is a Professor in Oil & Gas Upstream Business and the Director of the Center for Economics and Management in IFP School, a Graduate School for the energy and transport industries. The Center with a team of seven professors, assistant professors and researchers, runs five International Masters Programs in Energy, some of which are in partnership with American, Russian and European universities, for 170 students and professionals. Before joining IFP School, between 1976 and 1992, she had a variety of positions within the French Ministry of Industry, in the Oil and Gas division: economic, financial and strategic analysis, finance management for technological assistance procedure, creation of a technology and strategy scouting group for the oil services sector, fiscal audits for oil and gas production. She holds an engineering degree from IFP School, a Master's degree in Theoretical Geophysics from the Institut de Physique du Globe de Paris and a MBA from the Sorbonne Graduate Business School. She is coordinator and co-author of the book "Oil and Gas Exploration and Production – Reserves, costs, contracts" published by Editions Technip.

Arash Farnoosh holds Graduate Engineer’s Degrees from both Institut National des Sciences Appliquées and Ecole Nationale Supérieure du Pétrole et des Moteurs (French Grandes Ecoles). He also holds a Research MSc in Energy and Transfer Engineering from the University of Toulouse. He got his PhD from the University of Montpellier at the Centre of Research on Energy Economics & Law. He teaches courses on energy economics, natural gas and electricity management and renewable energies at IFP School and supervises a Master’s program in Petroleum Economics & Management. Prior to become a faculty member and economist at the IFP School he worked in many companies such as AIRBUS France, TOTAL E&P and BNP Paribas Investment Banking group as a techno-economic engineer and analyst.

COURSE OUTLINE

Session 1: Upstream Global Outlook

Organization of the course. Global oil & gas value chain, Investments and Profitability, Upstream Industry Structure, Relations between the different Players (JV, operator and JOA).

References

- Exploration-Production Glossaries (IFP School glossary and ESANDA Engineering glossary)
Recommended Readings

- Andrew Inkpen, Michael Moffett, The Global Oil & Gas Industry, PennWell, 2011
- World Energy Investment, Executive Summary, IEA, 2016
- AIPN, JOA Model

Session 2: From Resources to Reserves

Differences between Resources and Reserves. Different categories of reserves. Booking of reserves – Conventional oil (onshore, API°: light, medium, heavy) versus Unconventional Heavy (Venezuela), Kerogen oil (Estonia), Shale & Tight oil (The US revolution in a global perspective), Oil Sands (Canada).

Required video BEFORE the lecture
Stanford University, Woods Institute, "The Future of Oil" by Robert Horne - http://www.youtube.com/watch?v=KTsYjRqPmNA

References

- TOTAL Planet Energy
- Memo cards on reserves
- Brodman John, Ifri, actuelles de l’Ifri, The U.S. Oil and Gas boom, 2012 (overview and very clear explanation of the differences between oil shale/shale oil & tar sands)

Recommended Readings

- Radetzki M, Peak Oil and other threatening peaks – Chimeras without substance, Elsevier, Energy policy 38 (2010) 6566-6569 (Global oil resources are huge and expanding, and pose no threat to continuing output growth within an extended time horizon)
- De Almeida P, Silva P.D., Timing and future consequences of the peak of oil production, Elsevier, Futures 43 (2011) 1044-1055 (in this work, the authors discuss the peak of oil production and analyse the problems it will create)
- Rice University, James A. Baker III Institute for Public Policy, The status of oil reserves, October 2011 (Conventional and unconventional resources in the future supply mix)
- Fattouh Bassam & Sen Amrita, The US Tight Oil Revolution in a global perspective, The Oxford Institute for Energy Studies, September 2013 (the neglected impacts of this revolution)
- Cornot-Gandolphe S., La revanche des pétroles de schistes, Etudes de l’IFRI septembre 2017
- Video: /www.europeunconventionalgas.org/?gclid=COuH1tuYvK4CFcwjfAodlx9IkW
- (Process of Hydraulic Fracturing)

Session 3: Upstream Project from exploration to site rehabilitation

The different phases of an Upstream project: exploration, appraisal, development, production and abandonment (Techniques and Economics). The technical cost and the break-even.
Required Readings
Memo cards on seismic, drilling and reservoir engineering before the lecture

Recommended Readings
- Bret-Rouzaut N & Favennec JP, Oil and Gas Exploration & Production, Reserves, costs, contracts, Ed Technip, new edition September 2011, only the Chapter 4

Assignment: Quiz (Individual)

Session 4: Techno-Economics of Natural Gas Chain
Be able to understand the global structure of the natural gas industry from well head up to the final consumer. And to analyze the structure of LNG chain and make comparative analysis with non-liquid natural gas in terms of contracts, financing, techniques and economic evaluations

Recommended Readings
- Natural gas: A Basic Handbook, J.G. Speight
- Natural Gas in Nontechnical Language, Rebeca L Busby
- LNG “A Nontechnical Guide”, Michael D. Tusiani and Gordon Shearer

Session 5: Analysis of an oil field and the Business Models of oil companies
Be able to analyze the different components of an oil field (Techniques and Economics) and to compare the different upstream business models.

Recommended Readings
- Business Journals

Session 6: Natural Gas Transport: Techno-Economic Evaluation
Be able to calculate the profitability of a long distance natural gas pipe-line project.

Recommended Readings
- Oil & Gas Pipelines in Nontechnical language, T O Miesner and W L Leffler
- Corporate Finance (chapters related to capital budgeting), J Berk and P Demarzo

Session 7: Natural Gas and Power Generation
Be able to evaluate the natural gas valuation process and make investment decisions for natural gas power plants

Recommended Readings
- Handbook utility Management, A Bausch and B Schwenker, Springer
- Power Systems Economics, Steven Stoft
Assignment: Quiz (Individual)

Session 8: Taxation systems
Understanding of the different types of access rights and ownership and the various Fiscal regimes: Concession, Production Sharing Contracts and Service contracts

Required Readings
- Bret-Rouzaut N. & Jones P.E., Petroleum contracts & Fiscal terms, Dec 2002
- Maximazing the value of oil resources in the MENA region – the critical role of petroleum fiscal systems, Booz & Company analysis

Recommended Readings
- Bret-Rouzaut N & Favennec JP, Oil and Gas Exploration & Production, Reserves, costs, contracts, Ed Technip, new edition September 2011, Chapter 6
- Johnston D & Johnston D, International Petroleum Fiscal System Analysis – State of Play, OGEL (Oil, Gas & Energy Law Intelligence), March 2011 (It discusses the various issues and economic logic that form the basis of modern analysis of a typical fiscal system)
- Darmois Gilles, Sharing the oil rent, current situation and good practice, Editions Technip, 2014

Session 9: Case-study: profitability of an upstream project with a concession system
Be able to calculate the profitability of a field: CF table, discount rate, NPV, IRR, POT, sensitivity analysis

Required Reading
Presentation explaining the basics of the profitability analysis

Assignment for this session: excel spreadsheet with a one-page business report

Session 10: Strategy of an Independent Company
Key words: US independent Denbury, Bakken Shale oil, EOR, CO2, CCS, diversification, Tool: SWOT Analysis.

Required readings BEFORE the course
- National Energy Technology Laboratory (NETL), US Department of Energy, Carbon Dioxide Enhanced Oil Recovery, March 2010 (Brief introduction to the physics of CO2 EOR and sequestration and the economics on which it is implemented)

Recommended:
http://www.denbury.com/
Assignment for this session:
Short Executive report

Session 11: Natural Gas Markets Status & Future
Be able to differentiate between various properties (techniques & economics) of regional gas markets and contexts for making rational and adapted investment/trading decision

Recommended Readings
• Energy Economics: Concepts, Issues, Markets and Governance (Chapters dedicated to natural gas supply), S.C. Bhattacharyya
• Same thing in French: Energie: Economie et Politiques, Jacques Percebois et Jean-Pierre Hansen

Session 12: Conclusive Session
Be able to synthesize all the strategic aspects (from both technical and economic points of view) of a major oil & gas project by applying the tools already learnt during previous sessions.