Natural Resource Evaluation and Development Strategy

Module 4, 2016-2017 year

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Course description

The course will provide the foundations needed to analyze various resources, such as oil, natural gas, geothermal, water, solar, wind. The resource evaluation framework will incorporate the principles of microeconomics, industrial organization, supply chain management, and project financing, and would be equally useful for engineers, economists, financial analysts, and policy-makers. The course emphasizes the importance of interdisciplinary knowledge. The utility of the presented approaches is demonstrated through case studies.

The students will:

- learn how to evaluate resources, from economic, financial and policy-maker perspectives;
- learn to apply their theoretical knowledge, combining approaches from various economic disciplines, to real world decision-making problems;
- learn to work in team utilizing individual capabilities and background knowledge;
- practice their presentation and communication skills.

Course requirements, grading, and attendance policies

Prerequisites: Microeconomics
Teaching and Work Forms : lectures + workshop presentations. Case studies will be assigned to group for analytical essay and presentations.

Grading policy: the Grade will come via following criteria:
· Attendance 20%
· Homework assignments 20%
· Group presentations and analytical essays (10-15 pages) 60%

Course contents

1. Introduction (1 lecture)

- Course overview: goals, grading, sources of information
- Motivation for the course: socio-economic and financial role of resources, parties involved, questions
- Demonstration: the interdisciplinary study of shale oil play

2. Resource and its definition (1 lecture)

- Resource characteristics:
  - Resource estimations and resource density maps,
  - Energy potential and its dimensionality

- Characterizing the resource: data acquisition and data analysis - Related uncertainties and their importance

3. Resource production (2 lectures)

- Production characteristics and capabilities:
  - Production possibilities frontier,
  - Production decline profiles,
  - Spatial distribution
  - Quality matters
- Production data and data analysis
- The role of technology and other uncertainties

4. Project evaluation vs. resource evaluation (3 lectures)

- Project Economics: Cash flow analysis and Value of Options
- Project Evaluation: Productivity vs. (relative/absolute) Profitability
- Sensitivity analysis: costs and prices, production profiles, discounting, depreciation, taxation, infrastructure and other parameters.
- Technically recoverable vs. economically recoverable resources - Aligned and conflicting views of different stake-holders.

5. Resource development strategy (3 lectures)

- Supply capabilities and capacities
- Budget and physical constraints
- Profit maximization vs loss minimization
- Intertemporal view
- Company strategy and industry development: growth vs. maturation:
- Market and policy environments
- Resource development strategy and outlook

6. Workshop presentations (4 lectures)

- Case studies of various resources from different perspectives

Case study topics (will be advised)