

**ENERGY MARKET DESIGN AND REGULATION****Syllabus****5 Units: Lectures + Lab Section****I. Instructor information**

Name: Rimvydas Baltaduonis, Ph.D.

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Office: Landau 142

Office hours will be held in person:

X/Y X:00am - X:00am

Lecture meeting times, place:

X/Y X:00am - X:00am in X

Lab section meeting times, place (pick one of the available times):

X/Y X:00am - X:00am in X

TA for the course: X Y (xy@stanford.edu)

TA office hours and place:

X/Y X:00am - X:00am in X

**II. Overview**

Energy is a critical input for any economy's stability and growth. Access to safe, reliable and affordable energy serves as a bedrock, on which the welfare of households, the competitiveness of firms and the resilience of public rest. This course explores fundamental economic and financial aspects related to energy supply and demand, while focusing on the ongoing energy transition. It discusses the roles of markets, regulation and deregulation in industries directly connected to energy, such as the electric power and transportation sectors. The course examines market design questions related to energy generation, transmission, distribution and emissions control. It investigates the economics of energy markets and individual behavior under alternative institutional regimes, focusing on how different policies or social norms affect economic performance under both static and dynamic conditions. It combines approaches of market design, behavioral economics, institutional economics, public choice, regulatory economics, industrial organization, experimental economics and applies them to the current energy-related questions. This course uses a combination of hands-on learning through classroom experiments, simulations and student-led discussions of readings. By building on this experience and gained knowledge, students develop projects to explore different public and private applications in markets for energy.

**III. Learning Goals**

By the end of this course students should be able to:

- 1) apply economic analysis to evaluate problems related to energy issues,
- 2) use economic data and empirical evidence to inform opinions on the energy policy alternatives,

- 3) acquire knowledge specific to the topic of energy economics, markets and regulation,
- 4) communicate effectively in written, spoken and graphical form about energy economics and policy issues,
- 5) possess programming skills needed to design standard economics experiments
- 6) know how to locate and use primary data sources (International Energy Agency, U.S. Energy Information Administration, Federal Energy Regulatory Commission, etc.),
- 7) understand and evaluate current economic events and new market design and regulation ideas related to energy sector.
- 8) state your personal goal: \_\_\_\_\_

#### **IV. Texts and other materials for course**

The readings for the course (copies of required course books will be available through the library reserve including the online ebook versions):

*Required:*

- Dahl, C., International Energy Markets: Understanding Pricing, Policies, and Profits, 2nd Ed. PennWell, 2015. Hereinafter referred to as DAHL.
- Perez-Arriaga, I. J., Regulation of the Power Sector, Springer, (ed.) 2013, Hereinafter referred to as PA.
- Other readings are journal articles that will be made available on Canvas website for the course.

*Recommended:*

- Wolak & Hardman. The Future of Electricity Retailing and How We Get There. Vol. 41. Springer Nature, 2021
- Davis & Holt, Experimental Economics, Princeton University Press, 1993.
- E&E News (Energy & Environment database provides daily coverage of environmental and energy policy and markets)
- Wall Street Journal, New York Times, Economist, Bloomberg

#### **V. Expectations of Students**

- (1) Courses taught in the Department of Economics are covered by a common set of course management policies approved by the Faculty. Students are responsible for knowing and abiding by these course policies:  
<https://economics.stanford.edu/undergraduate/major/economics-common-syllabus>
- (2) Students will read assignments as given in class and also under the “readings” section and come to class prepared to discuss the readings.
- (3) Students will take short quizzes on the assigned readings in the beginning of the lecture throughout the course (everyone gets two “free” missed quizzes) and will complete one midterm test in order to assess understanding of core concepts/principles from the course.
- (4) Students in groups of two or three will write three papers concerning the case/problem/question/policy relevant to energy sector that they have chosen to

examine more closely during the quarter. The first short paper will describe the issue of investigation and its relevance. The second paper will provide an extensive literature review on the issue. The third paper will involve a theoretical analysis (microeconomic, game theoretic, behavioral economics analysis) and also will include an experimental design proposal to study a hypothesis or to address policy alternatives.

- (5) Students in groups will prepare a final presentation to the class in which they will present the project they have developed during the quarter.
- (6) Students will learn how to program software for laboratory economics experiments, so they are able to design and conduct their own economics experiments.
- (7) Students will submit the assigned problems/questions/tasks on time (before the class on the due date unless otherwise stated) to receive credit for completing the work (everyone gets two “free” late/missed assignments).
- (8) Students will actively participate in classroom experiments and discussions (impossible without attending the class and being on time).

The assignments throughout the course are designed to pace and support students’ gradual learning, allowing everyone to succeed with persistent effort and dedication.

### **Course Schedule and Outline** (subject to changes)

Week 1: Introduction, overview; energy sources and uses

Week 2: Retail electricity markets and consumer behavior; smart grid development

Week 3: Wholesale markets for energy

#### **Paper 1**

Week 4: Capacity markets for energy supply; investment decisions into new generation capacity & technologies

Week 5: Emissions trading schemes and renewable energy certificates; regulation and antitrust policy in energy markets

#### **Paper 2**

Week 6: Transmission and distribution of power networks; distributed energy resources

#### **Midterm test**

Week 7: Utility business

Week 8: Student presentations; project software demonstrations

#### **Paper 3**

### **VII. Course Structure**

This course will be facilitated live and in person, with supporting materials posted on the course Canvas site: <https://canvas.stanford.edu/courses/X>. Lectures and sections will not be recorded. Slides used during instruction will be posted on Canvas after each day’s live sessions.

## **VIII. Basis of Grade**

Each student's final grade in this course will depend on the weighted average of grades for tests and assigned work, with weights as follows:

Midterm test	20%
Paper 1	5%
Paper 2	15%
Paper 3 / Final paper	25%
Presentations	15%
Participation (short quizzes, class experiments, lab sections, etc.)	10%
Homework assignments	10%
<i>Extra credit: Software design, programming &amp; demonstration</i>	5%

Generally averages of 90-100 will earn a grade within the "A" range; 80-89, within "B"; 70-79, within "C"; 60-69, within "D"; and averages less than 60, alas, "NP". Grades at the high end of the range will receive + and those at the end of the range, - (i.e., A+, A-).

Class participation includes: being informed, paying attention, fully participating in the discussion of other students' research, and attending course activities. You should inform the instructor by email if you are unable to attend a class.

## **IX. Honor Code**

The Honor Code applies, of course, to all work done in this course. Each student may use only approved notes and their own brainpower in completing any examination and assignments. You may ask for help in understanding the general approach to assignments, but you must do them on your own. You are to write your own responses to the discussion forum questions, but you are encouraged to talk with others in the seminar, family members, friends, etc., before responding.

*As a minimum standard of integrity*, all students are expected to understand and observe the Honor Code of Stanford University. Please consult with me if you have any confusion about authorized resources (including the use of AI) for an assignment or examination. Just as you would not choose to eat the minimum standard caloric intake for survival and as you would not choose to use the minimum amount of caution when driving your car, you should not strive to maintain just the minimum standard of integrity. Adhering to the highest standards of integrity is a better strategy

## **X. Privacy Statement and Accommodation**

We request that participants do not audio/video record live sessions, or distribute course materials without the instructor's permission. This protects the privacy rights of participants and facilitators, and the intellectual property and other rights of the university. Participants who may need sessions recorded should contact the instructor, or Stanford's Diversity and Access Office, as soon as possible. Students who have OAE letters and require accommodations should also fill out this online form: <https://forms.gle/7ArQZGHPRznQ7FjMA>. Our instructor is happy to make adjustments to facilitate learning and effective testing/evaluation of your performance.