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ECO 414S/1960S: Energy and Regulation
Summer 2023

COURSE DESCRIPTION:

Russia's invasion of Ukraine has underscored the role of energy in geopolitics. Prior to this, the Covid-19 pandemic had significant impacts on energy markets. Throughout, climate change continues to be a most pressing issue with little evidence of progress. This course provides a general treatment of the economics of energy markets and the use of regulation in addressing environmental and other issues arising in these markets. A central theme is the search for an appropriate balance between market forces and regulatory/government intervention. A related objective is the development of a framework for understanding the public discourse on energy, the environment and geopolitics. Familiarity with tools of microeconomics and statistics is essential. Topics include renewable energy and storage, electricity markets, global warming, carbon pricing, hydrocarbons (oil, natural gas, coal) and fracking, the politics and geopolitics of energy. An essential part of the course is following current issues.

TIME AND LOCATION: lectures and tutorials are on Zoom. Locations of in-person midterm and exam to be announced.

EVALUATION: late penalties are 10% per day

Midterm	25%	Thurs May 25, 2023
Assignment	15%	Fri Jun 9, 2023, by 11:59 PM
Paper	35%	Sun Jun 18, 2023, by 11:59 PM
Exam	25%	Exam Period

Late penalties on assignments and papers will be 10% per day (e.g., if the submission is worth 100 marks, the daily penalty will be 10 marks).

RESEARCH PAPER:

a. Undergraduate papers are to critically analyze an energy topic of interest.
b. Graduate students are required to include some empirical analysis in their paper.

You are responsible for selecting the topic. It should be on energy and related areas such as the environment, sustainability, regulation, security, politics/geopolitics, technology... You might consider browsing publications such as *Economics of Energy and Environmental Policy, Energy Policy, Energy Economics* and *The Energy Journal* … to name a few.

The paper will be submitted electronically through Quercus in portable document format (pdf).

a. Undergraduate papers should be approximately 3000 words. Graduate papers should be approximately 4000 words. This does not include the abstract, references, tables and graphics.
b. The paper should follow one of the following styles: APA, Chicago or MLA.
c. The structure of the paper must be as follows:
    i. Cover Page – Title of paper, name and student number, date submitted, word count and an abstract which is not to exceed 250 words.

ii. Introduction – the first paragraph will contain your **thesis statement** which must take a position. (E.g., "This paper will examine…" is **not** a thesis statement. "This paper finds that the cessation of Russian natural gas imports to Germany by the end of 2022 is feasible." is a thesis statement.
iii. Literature Review
iv. Analysis
v. Conclusions
vi. References – there should be a minimum of ten relevant items. At least five should be from peer-reviewed publications.

d. The "Analysis" section is a critical part of the paper. You should set out the evidence to support your thesis statement. You may want to critique positions taken by others.
   i. For graduate students, the "Analysis" section should include a description of the data and an explanation of empirical work that was conducted.
e. The "Conclusions" section should discuss policy implications.

Academic Integrity: You are reminded that plagiarism and cheating are **serious** academic offences with potentially serious penalties. **Plagiarism detection tools will be used on submitted work, including assignments, tests, exams and papers.** The purpose is to check for textual similarity and to detect possible plagiarism. The University of Toronto's Code of Behaviour on Academic Matters outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences (www.governingcouncil.utoronto.ca/policies/behaveac.htm). See also "Academic Integrity" link on the right side of the course Quercus page.

> **"Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site https://uoft.me/pdt-faq ."**
> **https://teaching.utoronto.ca/resources/plagiarism-detection/#conditions**

The knowing use of generative artificial intelligence tools, including **ChatGPT** and **other AI writing and coding assistants**, for the completion of, or to support the completion of, an examination, term test, assignment, or any other form of academic assessment is prohibited may be considered an academic offense in this course.

Missed Evaluations: The only generally acceptable reason for missing a term test/exam/assignment is illness. Normally, a medical certificate is required under such circumstances. In present circumstances we will abide by University policies which may not require such certificates.

Recordings: "Efforts will be made to record this course, including your participation, on video and whenever possible, will be made available to students in the course for viewing remotely. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation, and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor."
https://teaching.utoronto.ca/resources/recording-of-lectures-and-class-sessions/

IN THE NEWS

Students will follow current issues in energy by signing up for news alerts (e.g., through Google Alerts). Subscribe to MIT Energy Initiatives updates by visiting http://energy.mit.edu/news/. Classes will usually begin with a brief discussion of the week's developments in energy. Students should regularly visit MIT Technology Review http://www.technologyreview.com/ to review advances in energy. For insightful commentary on a range of issues, visit Project Syndicate which is available through our library system through https://login.library.utoronto.ca/index.php?url=https://www.project-syndicate.org/. You will also be required to read assigned articles in the Washington Post, the BBC and the New York Times and other media. Through our library system you have access to an extensive database of many international newspapers.

COURSE MATERIALS

1. Daniel Yergin, *The New Map: Energy, Climate and the Clash of Nations*, Penguin Press, 2020.
2. Richard Muller, *Energy for Future Presidents*, *The Science Behind the Headlines*, Norton 2012.
3. Jeffrey Sachs, *The Age of Sustainable Development*, Columbia University Press, 2015. Hardcopy and Kindle editions available. Also available electronically through UofT Libraries. Chapter summaries available at https://cup.columbia.edu/extras/supplement/sachs-9780231173148.

LECTURE TOPICS AND READINGS

1. Background and Introduction (Lecture 1, 2)
    a. Yatchew, A. 2014: "Economics of Energy: Big Ideas for the Non-Economist", Energy Research and Social Science, 1:1, 74-82.
    b. Muller, Parts I, II

2. Geopolitics, Politics and Regulation (Lectures 3, 4,5)
    a. Yergin, Introduction, America's New Map, Ch. 1-8. Russia's Map Ch. 9-16, China's Map Ch.17-25, Maps of the Middle East Ch. 26-36, Conclusion.
    b. Muller, Part V Advice for Future Presidents.
    c. "2018 Diplomat of the Year Chrystia Freeland: Read the Transcript", *Foreign Policy*, June 14, 2018, https://foreignpolicy.com/2018/06/14/2018-diplomat-of-the-year-chrystia-freeland-read-the-transcript/
    d. Amy Myers Jaffe, *Energy's Digital Future*, Chapter 3, China's Energy Strategy
    e. Bordoff, F. and Meghan L. O'Sullivan, "Green Upheaval: The New Geopolitics of Energy", Foreign Affairs, January/February 2022
    f. Bordoff, F. and Meghan L. O'Sullivan, "The Age of Energy Insecurity: How the Fight for Resources Is Upending Geopolitics", Foreign Affairs, May/June 2023.

LECTURE 6 -- MIDTERM

3. Global Warming and Other Externalities (Lecture 7, 8)
    a. Robert Stavins, "The Problem of the Commons: Still Unsettled After 100 Years", *American Economic Review*, 2011, 81-108.
    b. Brander, J. A., and Taylor, M. S. "The Simple Economics of Easter Island: A Ricardo–Malthus model of renewable resource use." Am. Econ. Rev. 1998, 88(1), 119–138.
    c. Nordhaus, William, "The Climate Club: How to Fix a Failing Global Effort", *Foreign Affairs*, May/June 2020.

   d. Climate Leadership Council, February 2017, "The Conservative Case for Carbon Dividends", available at https://www.clcouncil.org/media/2017/03/The-Conservative-Case-for-Carbon-Dividends.pdf.
   e. Yatchew, A. 2016, "Rational vs. 'Feel-Good' Carbon Policy – Transferability, Subsidiarity and Separation" Energy Regulation Quarterly, 4:3, 31-40.
   f. Yergin Climate Map Ch. 41-46.
   g. Erickson, A. S., & Collins, G. (April 13, 2021). Competition with China can save the planet: Pressure, not partnership, will spur progress on climate change. Foreign Aff., 100, 136.
   h. Geall, S., Peters, R., Tsang, B., Erickson, A., & Collins, G. (July 23, 2021). Can America trust China to fight climate change? Foreign Affairs. https://www.foreignaffairs.com/articles/united-states/2021-07-23/can-america-trust-china-fight-climate-change

4. Electricity and Renewables (Lecture 9, 10)
   a. Yergin Roadmap Ch. 37-40.
   b. Muller, Part III
   c. MIT Energy Initiative, "Utility of the Future", 2016, Executive Summary, http://energy.mit.edu/research/utility-future-study/.
   d. Yatchew, A. 2019, "How Scalability is Transforming Energy Industries" Energy Regulation Quarterly, 7:2, 35-44.
   e. Richard Green and Adonis Yatchew 2012: "Support Schemes for Renewable Energy: An Economic Analysis", *Economics of Energy & Environmental Policy*, 1, 83-98.
   f. Scott P. Burger, Jesse D. Jenkins, Carlos Batlle, Ignacio J. Pérez-Arriaga 2019 "Restructuring Revisited Part 1: Competition in Electricity Distribution Systems" *The Energy Journal*, 40: 3, 31-54.
   g. Scott P. Burger, Jesse D. Jenkins, Carlos Batlle, Ignacio J. Pérez-Arriaga 2019 "Restructuring Revisited Part 2: Coordination in Electricity Distribution Systems" *The Energy Journal*, 40: 3, 55-76.
   h. Olmstead, D.E.H. and A. Yatchew, 2022, "Carbon Pricing and Alberta's Energy-Only Electricity Market", *Electricity Journal*, 35:4, May 2022.

5. Oil, Natural Gas and Coal (Lecture 11,12)
   a. Bill McKibben, "Why Not Frack?", *New York Review of Books*, March 8, 2012. Reply by John Deutch, *New York Review of Books,* April 26, 2012.
   b. James Hamilton, "Historical Oil Shocks," in Routledge Handbook of Major Events in Economic History, pp. 239-265, edited by Randall E. Parker and Robert Whaples, New York: Routledge Taylor and Francis Group, 2013.
   c. Lutz Kilian L. (2015) Energy Price Shocks. In: Palgrave Macmillan (eds) The New Palgrave Dictionary of Economics. Palgrave Macmillan, London. https://doi.org/10.1057/978-1-349-95121-5_3008-1
   d. Yatchew, A. and J.A. No, 2001: "Household Gasoline Demand in Canada", *Econometrica*, 1697-1710.

ADDITIONAL REFERENCES, SOURCES AND READINGS

1. *Encyclopedia of Energy*, ed. Cutler Cleveland. Available electronically through UofT Libraries.
2. Carol Dahl, *International Energy Markets*, PennWell, 2004, updated edition 2015.

3. International Energy Agency http://www.iea.org Most recent documents are available electronically through the University of Toronto Libraries. *Energy Statistics Manual*, *Electricity Information, IEA Statistics, Key World Energy Statistics*.
4. Lawrence Livermore Laboratories. Energy and Carbon Flow Charts https://energy.llnl.gov/
5. International Energy Agency, energy flow charts https://www.iea.org/Sankey/
6. International Energy Agency, most recent documents are available electronically through the University of Toronto Libraries. See also http://www.iea.org/
7. International Energy Forum https://www.ief.org/
8. Canada Energy Regulator: https://www.cer-rec.gc.ca/index-eng.html (formerly the National nergy Board).
9. BP (formerly British Petroleum) www.bp.com/statisticalreview, *Statistical Review of World Energy*, *Statistical Review Workbook* (Excel spreadsheet).
10. World Resources Institute – GHG gas data, slide presentation, papers, annual "Stories to Watch"
11. Freedom House https://freedomhouse.org/ -- annual country reports and Freedom House map https://freedomhouse.org/explore-the-map?type=fiw&year=2022.
12. Reporters Without Borders https://rsf.org/en/index
13. Human Rights Watch https://www.hrw.org/
14. Amnesty International https://www.amnesty.org/en/
15. Vaclav Smil, Energy and Civilization: A History, 2017, MIT Press. Chronology of Energy-Related Developments
16. MIT Energy Initiative conducts research and posts reports on a broad range of topics. See http://energy.mit.edu/studies-reports/.
17. Daniel Yergin, *The Quest*, The Penguin Press, 2011. Hardcopy, Kindle and Audible versions available.
18. Our World in Data https://ourworldindata.org/
19. Penn World Table https://www.rug.nl/ggdc/productivity/pwt/?lang=en
20. Jeffrey Sachs, *The Age of Sustainable Development*, Columbia University Press, 2015. Hardcopy and Kindle editions available. Also available electronically through UofT Libraries. Chapter summaries available at https://cup.columbia.edu/extras/supplement/sachs-9780231173148.
21. Bruce Usher, *Renewable Energy: A Primer for the Twenty-First Century*, Columbia University Press, 2019. Available electronically through University of Toronto libraries. Also, hardcopy and Kindle version available.