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ECO 314F: Energy and the Environment
Summer 2022

COURSE DESCRIPTION:
The war on 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 most pressing issue with evidence of little progress. This course surveys important features of energy markets and related environmental challenges in a rapidly changing world. One of the central objectives is to provide an understanding of the key economic tools needed to analyse these markets and to develop an appreciation for the political and geopolitical centrality of energy issues. A related objective is the development of a framework for understanding the public discourse on energy and the environment. Topics include the hydrocarbon economy (oil, natural gas and coal), electricity markets, global warming and other externalities, renewable energy and conservation, carbon pricing, sustainability and the geopolitics of energy.

TIME and LOCATION: Tuesdays 1-4, Fridays 10-1.

RELATED COURSES: ECO 414S Energy and Regulation; ENV462H1: Energy and Environment: Economics, Politics, and Sustainability. ECO 314F is not an exclusion to either of these courses.

EVALUATION: Late penalties are 10% per day.

Midterm	25%	Fri May 27, 2022 (during class)
Assignment	15%	Fri Jun 3, 2022, by 11:59 PM
Paper	35%	Sun Jun 19, 2022, 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).

The Assignment must be submitted as a single pdf document through Quercus with answers to all questions and their sub-parts in the original order and clearly numbered for easy identification. Answers numbered incorrectly will not be given credit. You are required to submit solutions to all questions. **However, only a subset will be graded.** The list of questions that are to be graded will not be revealed in advance.

The Paper will be submitted electronically through Quercus in portable document format (pdf). The paper should be about 3000 words. This does not include references, tables and graphics.

a. The paper should follow one of the following styles: APA, Chicago or MLA.
b. 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 at least seven relevant items. A minimum of three should be from peer-reviewed publications.

c. The "Analysis" section is a critical part of the paper. You should set out the evidence and argument to support your thesis statement. You may want to critique positions taken by others.
d. The "Conclusions" section should discuss policy implications.

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).

The only generally acceptable reason for missing a term test 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.

IN THE NEWS

Students are required to 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 OBJECTIVES

1. Broad overview of major areas of energy economics and related environmental issues.
2. Brief review of important economic tools used to analyse energy markets.
3. Understanding public discourse on energy and environmental debates, (e.g., decarbonization, fracking, renewable energy, markets v. regulation, geopolitics …).
4. Facility with data resources on energy and related environmental issues.

COURSE MATERIALS

1. Richard Muller, *Energy for Future Presidents*, Norton, 2012. Hardcopy and Kindle versions available.
2. 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.
3. Freedom House https://freedomhouse.org/ -- annual country reports and Freedom House map https://freedomhouse.org/explore-the-map?type=fiw&year=2022.
4. Jaccard, M. *The Citizen's Guide to Climate Success*, Cambridge University Press, 2020, Entire pdf version available at https://www.cambridge.org/core/books/citizens-guide-to-climate-success/49D99FBCBD6FCACD5F3D58A7ED80882D
5. Daniel Yergin, *The New Map: Energy, Climate and the Clash of Nations*, Penguin Press, 2020.

6. 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
    a. Yatchew, A. 2014: "Economics of Energy: Big Ideas for the Non-Economist", Energy Research and Social Science, 1(1), 74-82, http://dx.doi.org/10.1016/j.erss.2014.03.004 , available electronically through University of Toronto libraries.
    b. Muller, Part I, Ch. 1- 2., Part IV.
    c. Jaccard, Ch. 1.
    d. U.S. Energy Information Administration, "Canada Country Analysis Brief". Updated periodically on the EIA website https://www.eia.gov/international/analysis/country/CAN.

2. Milestones in Energy History
    a. Smil, Vaclav "World History and Energy" in *Encyclopedia of Energy*, Volume 6, 2004 Elsevier Inc. Available electronically through University of Toronto Libraries.

3. Brief Review of Economic Tools
   Refer to your texts in microeconomics to review the following subject areas: supply/demand analysis; consumer and producer theory; industry structures – monopoly, oligopoly, monopolistic competition, perfect competition; game theory; externalities; public goods; taxes and deadweight loss; regulation and competition policy. See in particular: Competition Bureau Merger Enforcement Guidelines http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/vwapj/cb-meg-2011-e.pdf/$FILE/cb-meg-2011-e.pdf

4. Geopolitics, Politics and Policy
    a. "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/
    b. Yergin, Russia's Map Ch. 9-16, China's Map Ch. 17-25, Maps of the Middle East Ch. 26-36, Conclusion.
    c. Muller, Part V Advice for Future Presidents.
    d. Pineau, Pierre-Olivier "Canadian Energy in Multiple Crises: From Pipeline and Climate to Covid-19", Slides from webinar, April 15, 2020.

5. Environmental Issues
    a. Brander, James, "Easter Island: Resource Depletion and Collapse", *Encyclopedia of Energy,* 2004 edited by Cutler Cleveland.
    b. Muller, Part I, Ch. 3 Global Warming and Climate Change.
    c. Jaccard, M. *The Citizen's Guide to Climate Success*, Cambridge University Press, 2020, Ch. 4,6, 10-12.
    d. Nordhaus, William, "The Pope & the Market", *New York Review of Books*, October 8 2015. http://www.nybooks.com/articles/archives/2015/oct/08/pope-and-market/
    e. Nordhaus, William, "The Climate Club: How to Fix a Failing Global Effort", *Foreign Affairs*, May/June 2020.

   f. 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 .
   g. Yergin Climate Map Ch. 41-46.

6. Electricity and Renewables
   a. Muller, Part II, Ch. 7, Part III, Ch. 8-11, 13, 15, 18.

7. Hydrocarbons – Oil, Natural Gas, Coal
   a. Muller, Part II, Ch. 4-6, Part III, Ch. 14.

ADDITIONAL REFERENCES AND READINGS

1. Lawrence Livermore Laboratories, energy and carbon flow charts https://energy.llnl.gov/
2. International Energy Agency, energy flow charts https://www.iea.org/Sankey/
3. MIT Energy Initiative conducts research and posts reports on a broad range of topics. See http://energy.mit.edu/studies-reports/.
4. Daniel Yergin, *The Quest*, The Penguin Press, 2011. Hardcopy, Kindle and Audible versions available.
5. International Energy Agency, most recent documents are available electronically through the University of Toronto Libraries. See also http://www.iea.org/
6. Canada Energy Regulator: https://www.cer-rec.gc.ca/index-eng.html (formerly the National Energy Board)
7. BP (formerly British Petroleum) www.bp.com/statisticalreview, *Statistical Review of World Energy*, *Statistical Review Workbook* (Excel spreadsheet).
8. Our World in Data https://ourworldindata.org/
9. Penn World Table https://www.rug.nl/ggdc/productivity/pwt/?lang=en