

History 102

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University of Michigan, Fall 2013

MW 10-11:30 in 1427 Mason Hall

History of the Present

Climate change, nuclear power, and energy futures — a post-Fukushima history

Will the world soon build hundreds of nuclear power plants to reduce carbon emissions and fight climate change? Only a few years ago, credible scenarios projected that climate change might lead up to 30 nations to launch new nuclear power programs between 2015 and 2030. These programs would build as many as 600 new nuclear power stations worldwide, reducing global carbon emissions by 11 percent or more and helping to shift the world energy economy away from fossil fuels.

Then, in March 2011, an earthquake and tsunami devastated northeastern Japan. Three reactors at the Fukushima Daiichi nuclear power plant suffered core meltdowns. Hydrogen explosions at the reactors spewed radioactive material into the air, rendering the region near the plant uninhabitable. Radioactive water leaked into the ground and spilled into the Pacific. As Japan reeled, industry spokespeople insisted that the accidents were a fluke. Newer, “inherently safe” reactor designs, they argued, could not suffer such accidents. Nevertheless, in the aftermath of the accident, Germany and Switzerland joined many other European countries in renouncing nuclear power. All of Japan's nuclear plants are currently closed. Their political future remains highly uncertain, while the Fukushima cleanup — which will take several decades — grinds on. Meanwhile, China is currently building 30 new reactors.

What are the likely impacts of climate change on human societies? Is nuclear power off the table as a partial solution? What are the prospects for renewable energy supplies? This course offers essential historical perspectives on climate, energy, and the nature of planetary risks.

Prerequisites: open to anyone. No prior background in science, engineering, or history is required.

Learning objectives

Students will emerge better equipped to understand not only debates about nuclear power and climate change, but also a variety of historical and contemporary issues surrounding energy futures and the politics of science and technology.

They will also develop the following skills:

- Taking a “long view” and applying it to critical thinking about current events
- Understanding path dependence in problems of energy and environment
- Critiquing historical writing
- Making persuasive arguments, both orally and in writing
- Analytic and synthetic reasoning
- Thinking about the future “outside the box”

Course policies and expectations

Attendance and tardiness: Attendance at lectures and sections is **mandatory**. Students will be responsible for all material covered in the lectures. We do recognize, however, that serious issues may arise that absolutely prevent you from attending class. You may therefore have up to three excused absences. All unexcused absences will affect your final grade or evaluation: **each** missed class will result in a one-third letter grade reduction in your **final** course grade. For example, if your grade should be a B+ but you had three unexcused absences during the semester, you would receive a C+ instead.

An excused absence is one that you inform us about before the class meeting and that receives approval from one of us. To be excused, you must present a compelling reason for your inability to come to class, and accompanying documentation (doctor’s note, coach’s note, etc). In the most exceptional emergencies, you may be excused for an absence that you have not informed us about ahead of time, but you should be prepared to present documentation after the fact.

Regular tardiness will also affect your final grade.

Policy on laptops, cellphones, iPods, etc.: just as you would not read a newspaper in class, please respect your instructors and your fellow students by refraining from non-course-related use of electronic devices during class. You are welcome to share notes with others, but since the process of note-taking itself improves your retention and understanding, we expect everyone to take their own notes and to review them later. It’s fine to use a laptop for this purpose. If you want to do this, however, you must sit in the designated area in the **back of the room**, and **wireless access must be turned off**. These are non-negotiable conditions of using a laptop during class. Wifi use creates a “**cone of distraction**” that harms both your class performance and that of those around you. Using email, Facebook, YouTube, ESPN, etc., will produce a **single one-time warning** from the instructor or GSI. Any further wifi use means no laptop access is permitted for the duration of the semester, and all subsequent notes must be taken longhand. *Cellphones should also be turned off at the start of every class.*

This policy is a matter of professionalism, collegiality, and respect. If you object, please do not enroll in this course.

Plagiarism policy: At the University of Michigan and in professional settings generally, plagiarism is an extremely serious matter. **Please paraphrase wherever possible**, since this helps you process and understand what you have read. If truly necessary, you can quote published work, but quotations must be clearly marked and properly attributed. You may

obtain copy editing assistance, and you may discuss your ideas with others, but all substantive writing and ideas must be your own or else be explicitly attributed to another, using a citation sufficiently detailed for someone else to easily locate your source.

All cases of plagiarism will be reported immediately. There will be no warnings, no second chances, no opportunity to rewrite. **Consequences can range from failing the assignment (a grade of zero) or failing the course to expulsion from the University.** For additional information about plagiarism, see the Rackham pamphlet on [Academic Integrity](#) and [Plagiarism: What It is and How to Recognize and Avoid It](#) from Indiana University. If you have the slightest doubt about whether you are using the words or ideas of others appropriately, please ask.

Recording and note-taking policy: You must notify us if you intend to record a class session. Special conditions apply to the use of such recordings. Recording or note-taking for commercial services, or for any non-enrolled persons, is prohibited.

Assignments and grading:

Reading responses (weeks 2-7 and 9-12): 25%

These will usually be “reading logs” (form available on Ctools) but may occasionally take other forms. See section syllabus for more details.

Discussion participation: 20%

Participating in class discussion is an essential part of learning. You are expected to contribute regular, thoughtful comments that reflect completion of the assigned readings and engagement with the material. Active participation will be an important component of your overall grade. Your comments may also draw upon your reading of the week’s news or other material, as long as you can make clear the relationship of such material to the topic at hand. Feel free to raise questions about anything in the reading that you didn’t understand: such questions are also a valuable way of advancing the discussion. **Note that attendance, while essential, is not equivalent to participation**

Take-home midterm exam: 20%

Final project: 35% (15% for the group component, 20% for the individual component)

You will work in small groups on a final project on alternative energy solutions. These projects will have an individual component (5-7 page paper) and a group component (a jointly produced 10-minute video presentation that covers the issues raised in the individual papers). Details will be handed out separately.

Required books:

Richard White, *The Organic Machine: The Remaking of the Columbia River* (Hill & Wang, 1995).

James R. Fleming, *Historical Perspectives on Climate Change* (New York: Oxford University Press, 1998).

Course Schedule

Week 1

January 8 — Introduction

Week 2

January 13 — Climate change: what risks? what costs?

Jonathan Foley, "Boundaries for a Healthy Planet," *Scientific American* 302, no. 4 (2010): 54-57

Videos:

[Earth: The Operator's Manual](#) (PBS, 2011, 53 min). Ideally, watch and discuss with a classmate or friend, in full screen mode at 720p resolution. For more information about any point made in the video, see the annotated script, which provides sources for all claims (click the green "e" symbol to the left of any sentence in the script.)

[Climate Change Causes Insurers to Rethink Price of Risk](#) (PBS NewsHour, 2012, 8 min)

Lord Nicholas Stern, professor at the London School of Economics and former World Bank chief economist, [lecture on the risks, costs, and opportunities of climate change](#) (The Greening Campaign, UK, 2013, 40 min)

January 15 — Fukushima: what do we learn from disasters?

Jacob Hamblin, "Fukushima and the Motifs of Nuclear History," *Environmental History* (2012): 1-15.

The National Diet of Japan, *The official report of the The Fukushima Nuclear Accident Independent Investigation Commission: Executive summary* (2012): 9-22.

Week 3

January 20 — NO CLASS — MLK Day

January 22 — Humans and Energy

Richard White, *The Organic Machine: The Remaking of the Columbia River* (Hill & Wang, 1995): introduction and chapters 1 & 2.

Week 4

January 27 — The Industrial age

White, *The Organic Machine*, chapter 3.

January 29 — Fossil fuels and early climate politics

Fleming, *Historical Perspectives on Climate Change*, Chapters 1-2

Videos:

“Crude: The Incredible Journey of Oil” (condensed version: [Part 1](#), [Part 2](#), [Part 3](#), total about 30 min)

“The Prize,” Part 2 ([Empires of Oil](#)), PBS documentary based on Daniel Yergin, *The Prize: Epic Quest for Oil, Money and Power*. Each part is about 53 min. You can skip the 2-minute intro sequences. There are 7 more parts, highly recommended (but we won’t be watching them in this course).

Week 5

February 3 — 19th century climate knowledge

Fleming, *Historical Perspectives on Climate Change*, Chapters 4, 6-7

February 5 — The Cold War: the emergence of nuclear systems

Gabrielle Hecht, “Political Designs: Nuclear Reactors and National Policy in Postwar France,” *Technology and Culture* (October 1994): 657-685.

Week 6

February 10 — The Cold War: computers and nuclear weapons research

George Dyson, *Turing’s Cathedral: The Origins of the Digital Universe* (2012), Chapters 10-11 (CTools). Skim the parts of this that concern the mathematics of explosions.

February 12 — The Cold War: computers, weather prediction, and weather control

William Winter, “[We CAN Control the Weather](#),” *Mechanix Illustrated* (January 1948). You can scroll down to read the transcribed text — but it’s more interesting to read the original pages one by one.

G. W. Platzman, "The ENIAC Computations of 1950 — Gateway to Numerical Weather Prediction," *Bulletin of the American Meteorological Society* 60, no. 4 (1979): 302-12

James R. Fleming, *Fixing the Sky: the Checkered History of Weather and Climate Control* (New York: Columbia University Press, 2010), Chapter 6

Week 7

February 17 — *Limits to Growth*, the supersonic transport, and global cooling

Fleming, *Historical Perspectives on Climate Change*, Chapters 9-10

Video: [Last Call](#), a historical review of the Limits to Growth debates (The Video Project, 2013, 5 min)

Club of Rome, "[What was the Message of 'The Limits to Growth'](#)"? (5 minute Flash presentation — can take 15-30 seconds to start up)

Dennis Meadows (one author of *Limits to Growth*), [retrospective talk at the Smithsonian Institution](#) (2012, 48 min). You can skip the intro by Roberto Peccei if you want; Meadows' presentation starts at about minute 5.

Recommended: *The Limits to Growth* (1972), especially the Introduction and Chapters 1-2.

You can also play with a [World3 model simulator](#), and examine how each part of the model works. Allow the web page to run Java if it challenges you — it's safe.

February 19 — Review: what we've learned so far

Week 8

February 24 — Midterm exam

February 26 — Introduction to final project

Video: [Powering the Planet](#) (PBS, 2011, 53 min). Ideally, watch and discuss with a classmate or friend, in full screen mode at 720p resolution. For more information about any point made in the video, see the annotated script, which provides sources for all claims (click the green "e" symbol to the left of any sentence in the script.)

March 3-5 — NO CLASS — Winter Break

Week 9

March 10 — Everyday nuclear risks: radiation effects

Joy Parr, "A Working Knowledge of the Insensible? Radiation Protection in Nuclear Generating Stations, 1962-1992," *Comparative Studies in Society and History*, Vol. 48, No. 4 (October 2006): 820-851.

March 12 — Extraordinary nuclear risks: reactor accidents

Sonja D. Schmid, "When safe enough is not good enough: Organizing safety at Chernobyl," *Bulletin of the Atomic Scientists* 67 (2011): 19-29.

Brian Wynne, "Misunderstood Misunderstandings: Social Identities and the Public Uptake of Science," *Public Understanding of Science* 1 (1992): 281-304.

Week 10

March 17 — Nuclear winter, the ozone hole, and climate politics

Andrew Revkin, "Hard Facts About Nuclear Winter," *Science Digest*, March (1985): 64-68, 77

Philip Shabecoff, "[Global Warming Has Begun, Expert Tells Senate](#)," *New York Times*, June 24, 1988 (2 pp.)

Video: Alan Robock, [TEDx talk on nuclear winter](#) (2013), 18 min.

[The Antarctic Ozone Hole — from Discovery to Recovery](#) (UN Environment Programme, 2011), 16 min.

Andrew Revkin [interview with James Hansen](#) (NASA climate scientist) in 2008, looking back at Hansen's 1988 Congressional testimony, 10 min.

March 19 — Costs and price in nuclear systems

Paul Joskow & John E. Parsons, "The economic future of nuclear power," *Daedalus* (Fall 2009): 45-59.

Henry Sokoloski, "The High and Hidden Costs of Nuclear Power," *Policy Review* 162 (Aug. & Sept 2010): 53-68.

Week 11

March 24 — The Intergovernmental Panel on Climate Change (IPCC)

Shardul Agrawala, "Context and Early Origins of the Intergovernmental Panel on Climate Change," *Climatic Change* 39, no. 4 (1998): 605-2

Pew Center on Global Climate Change, "Climate Change 101: International Action" (2009)

IPCC Working Group I, "Summary for Policymakers," *Climate Change 2013: The Physical Science Basis*

Video: [Climate Change 2013, IPCC Working Group I: The Physical Science Basis](#) (2013, 9 min)

Bruce Wielicki, [TEDxNASA — Climate Change: Fact and Fiction](#) (2011, 17 min)

March 26 — Climate Audit, Climategate, and the future of public science

Fred Pearce, "[Climate wars: the story of the hacked emails](#)," *Guardian* special investigation (2011). A 12-part series of long investigative reports by a respected science reporter. Read at least parts 1-5 and 11-12.

Video: Naomi Oreskes, [lecture about her 2010 book Merchants of Doubt](#) (2010, 6 parts, total time ~50 min)

Week 12

March 31 — Final project preparation

First drafts of individual papers due at the beginning of class.

April 2 — Nuclear renaissance?

Stewart Brand, *Whole Earth Discipline: An Ecopragmatist Manifesto* (Viking, 2009): chapter 4: "New Nukes."

Amory Lovins, "[Four Nuclear Myths: A commentary on Stewart Brand's Whole Earth Discipline and similar writings](#)," 13 October 2009, posted on Rocky Mountain Institute's website.

Ken Caldeira, Kerry Emanuel, James Hansen, and Tom Wigley, Open Letter "[To those influencing environmental policy but opposed to nuclear power](#)," shared publicly on Google+, Nov. 3, 2013.

Dale Bryk, Sheryl Carter, Ralph Cavanagh, David Goldstein and Kit Kennedy, "[Response to an Open Letter on the Future of Nuclear Power](#)," posted on Natural Resources Defense Council website, Nov. 5, 2013.

Watch on TED.com:

Stewart Brand and Mark Z. Jacobson debate: [Does the world need nuclear energy?](#) filmed February 2010, posted June 2010 (23 minutes)

Amory Lovins: [A 40-year plan for energy](#), filmed March 2012, posted May 2012 (27 minutes)

Week 13

April 7 — Adapting to climate change

K.M. Campbell, J. Gullledge, et al., *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (2007). We've given you the entire document, but you only need to read Part I, "Can History Help Us with Global Warming?"; Part II, "Three Plausible Scenarios of Future Climate Change"; and Conclusion (pp. 23-55 and 103-109)

["Adapting to climate change: facing the consequences,"](#) *The Economist* (2010)

Video: Lord Nicholas Stern, ["Addressing Climate Change and Opportunities for Investors"](#) (2012)

April 9 — Geoengineering

James R. Fleming, *Fixing the Sky: the Checkered History of Weather and Climate Control* (New York: Columbia University Press, 2010), Chapter 8

Daniel Cressey, ["Latest IPCC Climate Report Puts Geoengineering in the Spotlight,"](#) *Scientific American*, October 2013.

Week 14

April 14 — Energy futures: Final project presentations (1)

April 16 — Energy futures: Final project presentations (2)

Week 15

April 21 — Conclusion

— Final papers due —

