

GPHY 326-001: Geography of Energy Resources



And you reckon it's cheaper to leave it running all the time?

Spring 2015, M W 15:10-16:30 Traphagen 225
Instructor: Dr. Haggerty
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Course overview

Systems of energy production and consumption are among the most fundamental of all building blocks of human societies and yet, the more dependent societies become on complex energy systems, the more opaque the architecture of energy systems is to people. At the same time, the world faces unprecedented challenges in identifying energy systems that can meet the consumption demands posed by growing populations and economies, while also accommodating and adapting to the challenges posed by resource limits and climate change.

This course is designed to help students develop functional energy literacy in order to respond to these challenges. Energy literacy involves knowledge of basic physical, geopolitical, economic, cultural, and environmental dimensions of energy resource use and policy. This course emphasizes geographic considerations of the ways in which dimensions of energy systems shape and connect regions, peoples, and biophysical systems.

Specifically, this course provides an orientation to the basic properties of pre-industrial and contemporary energy systems; describes the global distribution of energy resources; explores implications of energy resource distribution for contemporary geopolitical and economic trajectories; and discusses environmental costs and benefits associated with energy choices. While this course will offer U.S. examples that are critical to energy literacy of U.S.-based students, it also offers global perspectives on energy resource use.



Structure: This course mixes lecture with other classroom activities such as in class discussion, debates, and small group activities. One field trip will introduce students to energy landscapes of Montana.

Learning Outcomes

Students can **identify and describe:**

- defining features of historic and contemporary energy systems
- the variety of energy resources and technologies available to exploit them
- geographic patterns in the availability and use of energy resources
- current environmental challenges facing energy systems

Students can **apply**

- metrics of energy use and consumption
- energy-related development indicators
- energy literacy to consumption choices

Students can **analyze and evaluate**

- the role of energy resource availability in economic development
- energy as a feature of social inequality
- energy as a feature of geopolitical conflict
- links between energy and environmental/earth systems concerns



Required readings:

Everett, B., Boyle, G., Peake, S., Ramage, J. *Energy systems and sustainability*. Oxford, 2012.

Bridge, G. and P. Le Billon. *Oil*. John Wiley & Sons, 2013.

Goodell, J. *Big coal: the dirty secret behind America's energy future*. Houghton Mifflin Harcourt, 2007.

In addition, the course will draw on other short readings to illustrate key concepts and case studies. These will be provided via D2L. You will be expected to attend to regular news/current event announcements made through D2L news and email. It will be helpful to be a regular user of the New York Times and E&E Daily services, which are available through the library.

Assessment: (out of 100 possible points)

Engagement: 25%

- Class attendance and participation, 20 points. There are two allowed unexcused absences after which you will fail the attendance score.

Rubric:

- 18-20pts (A): Attended all classes and made a significant effort to contribute on a regular basis
 - 16-18 pts (B): Attended all classes and made an average effort to contribute on a regular basis
 - 14-16 points (C): Achieved minimum required attendance but participated with noted infrequency
 - <14 points (D): 3 unexcused absences (results in a zero) and/or failure to participate or unproductive participation
- Attendance on class field trip, 5 points

Preparation: 25%

- No more than 10 weekly quizzes on reading and/or reading-based homework assignments (25 points, scored as average of all assignments, with two lowest scores dropped).

Application & Synthesis: 50%

- Two 8-10 page papers focused on energy landscapes (1) and renewable energy sources (2), including an in-class discussion of findings on paper 2 (15 points each).
- Midterm and Final exam (20 points total) comprising both short answer identification and reflective essay questions.

Key Dates:

Midterm: Mar 4

Paper #1 – Energy Landscapes due: Mar. 16th

Paper #2 – Renewables due: Apr. 22nd

Field Trip: provisionally Friday April 5

Final Exam: May 4th, 4-5:50pm

Important Policies

Student responsibilities ...

- Come to **every** class prepared and ready to contribute, including having assigned reading materials on-hand with notes so that you can make informed contributions.
- Use electronics only for reading & other course materials; e.g., contribute to a productive classroom atmosphere. Students detracting from a productive atmosphere will be asked to leave and will be marked absent for the day.
- Check D2L regularly for latest course schedule, updates, news announcements, etc.
- Plan ahead to avoid last minute crises; follow MSU Student Code of Conduct 310.01 regarding officially excused activities.
- Alert instructor to necessary disability accommodations within one-week of enrollment, work within guidelines of Disability and Veteran's services to coordinate special services (e.g. testing center schedules, etc.)

Instructor responsibilities ...

- Regularly update D2L, including quiz/homework scores (weekly) and
- Respond within 48 hours to all D2L emails
- Hold office hours
- Inspire, hold accountable, and otherwise help students learn!

Missed classes, late assignments, communications ...

- You may not turn in late homework or missed quizzes for credit.
- Late papers will be marked down one letter grade for each 24-hour delay, no exceptions.
- Make up exams are available for extraordinary circumstances and/or pre-arranged (1 week notice) excused absences.
- Professional courtesy is expected in all student-faculty communications.

Lecture notes ...

- Will be posted on D2L following class

- Study guides will be provided for each unit at end of unit or 2 weeks prior to exam, whichever comes first

Basic course schedule

Jan 14th-Feb 4th Energy System Basics

Energy Principles & Metrics, Energy Systems, Energy & Society theories; Energy & Climate
Supporting readings: Everett et al., Chapters 1-4; Short, Chapter 1

***No class Jan 19th*

Feb 9th-Mar 2nd Oil & Natural Gas

Geology & Exploration, Oil & World History/Capitalism; International Oil Developments and Geopolitics; Fracking

Supporting readings: Everett et al., Chapter 7; Bridge and LeBillon

***No class Feb 16th*

MIDTERM MAR 4

SPRING BREAK Mar 9-14

Mar 16-18 Hydropower & Nuclear

Opportunities and constraints of two historic “green energy systems”

Supporting readings: Everett et al., Chapter 10-11

Mar 23rd-Apr 8th Coal

Geology & Exploration, Coal & World History; Coal in the US, Montana and the Federal Coal Program

Supporting readings: Everett et al., Chapter 5, Goodell Parts One and Two

****April 5th, Coal field trip*

Apr 13th-29th Energy Transitions and Renewable Energy Sources

Policy & energy transitions; renewables

Supporting readings: Everett et al., Chapter 13-14, Goodell Part Three

****April 29th, Mansfield Center Energy Summit*

FINAL EXAM

