

BGS 370: Energy Technology and Policy

Semester: Fall 2011
Location: CBA 4.326
Day/Time: TTH from 11-1230
Course Listing: BGS 370
Unique #: 03090

Instructor: Carey King, Ph.D.
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Office hours: M 1:00 pm – 2:30 pm, TH 9:30 am – 10:45 am, and by appointment

Course Summary

Technology development for energy production and consumption is the driving force behind the broad economic growth that the world has experienced over the last two centuries. This economic prosperity has generally followed the production and consumption of fossil fuels. Due to issues including fossil resource depletion and related cost increases, environmental constraints, and geopolitical security, much of the world is looking to transition to renewable energy resources and technologies. However, there is tremendous debate on the feasibility and capabilities of future energy production options, both fossil and renewable.

This class will present students with the background information to understand the broad context of energy production and consumption in the United States and world overall. The class will begin with background material discussing past energy trends and fundamentals of energy and power including the different physical forms in which energy is stored and transformed. With these fundamentals, the class will explore the different energy resources, environmental impacts, and societal uses for these energy resources. After this class, students should have an appreciation for the different schools of thought ('pie in the sky' versus 'sky is falling') with regard to future energy technology options.

Grading Schedule

10%: 1 presentation of an energy article by each person (~3-5 minutes using 3-6 slides) where the article states an energy 'fact' and the student finds a data source to support or refute the 'fact.' Slides with comments and copy of article are part of deliverable.
15%: General class participation and commentary on reading materials
35%: Homework
20%: Mid-term exam
20%: Term paper on an energy technology and/or policy

Textbooks:

1. *The Bottomless Well* by Peter W. Huber and Mark P. Mills (2005). Basic Books.
2. *Limits to Growth: The 30-Year Update* by Donella Meadows, Jorgen Randers, and Dennis Meadows (2004). Chelsea Green Publishing.
3. *Energy in Nature and Society: General Energetics of Complex Systems* (Smil, 2008). The MIT Press.

The Bottomless Well:

Summary Quotes

Preface: "What lies at the bottom of the bottomless well isn't oil, it's logic. Fuels recede, demand grows, efficiency makes things worse, but logic ascends, and with the rise of logic we attain the impossible – infinite energy, perpetual motion, and the triumph of power. It will all run out but we will always find more." (Preface of *The Bottomless Well*)

Limits to Growth: The 30-Year Update:

Summary quotes:

"If current predictions of population growth prove accurate and patterns of human activity on the planet remain unchanged, science and technology may not be able to prevent either irreversible degradation of the environment or continued poverty for much of the world." – Royal Society of London and U.S. National Academy of Sciences, 1992 (Chapter 4 of *Limits to Growth: The 30-Year Update*)

"Human beings and the natural world are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices put at serious risk the future that we wish for human society and the plant and animal kingdoms, and may so alter the living world that it will be unable to sustain life in the manner that we know. Fundamental changes are urgent if we are to avoid the collision our present course will bring about". - Union of Concerned Scientists (1992) as quoted in *Limits to Growth: The 30-Year Update* (Chapter 1, p. 15).

Energy Data Sites and References:

1. Energy Information Administration: www.eia.doe.gov
 - a. *Annual Energy Review*
 - b. *Annual Energy Outlook*
 - c. Energy Information Administration (International Energy Annual):
<http://www.eia.doe.gov/iea/>
 - d. *International Energy Outlook*, 2005, 2008, EIA
2. Davis and Diegel, *Transportation Energy Data Book*, 2008, US Department of Energy
3. *BP Statistical Review of World Energy*

Observance of University policies: Standard University policies relating to accommodation for students with disabilities and to scholastic dishonesty will be followed in this course. Information regarding these policies may be found in the General Information Bulletin.

The University of Texas at Austin provides upon request appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TDD.

Measurement and evaluation:

Standard overall course/instructor evaluations will be administered at the end of the course, as well as periodic topical evaluations specifically focused on course improvement.