

**Patterson School  
Energy Security (DIP 735-001)  
Fall 2011**

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Class Time: Wednesdays 1000-1230  
Office Hours: Wednesdays 1230-  
1430 (sign up on sheet at POT 439)

**[1] DESCRIPTION**

The way the United States obtains and uses energy is a matter of national security. The nature of potential threats ranges from the geostrategic tensions that come with depending on oil to the destabilizing consequences of global climate change. This course will look at why energy security is such a significant challenge for the United States, and how the United States might meet that challenge.

You will look at the connection between energy and the economy in both the US and other states, and the connection between energy and military security and power. This will involve a detailed review of the US energy economy, the international energy market, and the energy economies of the major Middle Eastern states, Russia, Central Asia, China, India, and key African states. You will study how the distribution of strategic energy resources and technologies, particularly oil, natural gas, coal, nuclear energy and renewable resources will affect the national security of the United States. Finally, you will use your knowledge of the economics, science, and politics of energy to evaluate and develop energy policies in an ever changing world of reduced conventional oil supplies, climate change, water shortages, and other critical issues.

**[2] STUDENT LEARNING OUTCOMES**

At the end of the course you will be proficient in analyzing four aspects of energy security: strategic (geopolitics, poverty, and conflict), economics (markets, jobs, and the resource curse), technology (extraction, carbon capture, renewable resources, and smart grids) and global governance of the environment (international organizations and treaty regimes). You will understand the history of energy security, be aware of the data sources for current policy analysis, and be familiar with the energy security policy debate both in the United States and in key energy producing and consuming states. Finally, you will be able to write policy memos, executive summaries, and country reports, as well as to persuasively present ideas and lead group discussions.

**[3] PREREQUISITES**

There are no prerequisites for the course.

#### **[4] COURSE FORMAT**

Each class will be comprised of both a lecture and class discussion. The instructor will provide the lecture and students will lead the discussion. Discussion can be more or less structured, combining readings to extract general themes.

Any student with a disability who is taking this class and needs classroom or exam accommodations should contact the Disability Resource Center, 257-2754, Room 2, Alumni Gym, jkarnes@uky.edu.

#### **[5] COURSE OVERVIEW**

- 1. Why is Energy a National Security Issue?/Overview of Course [August 24, 2011]**
- 2. Oil Economics [August 31, 2011] Professor Hillebrand**
- 3. Modelling Energy Security [September 7, 2011] Aron Patrick**
- 4. The US Military and Energy Security [September 14, 2011]**
- 5. The Americas and Energy Politics [September 21, 2011]**
- 6. The Persian Gulf and Resource Wars [September 28, 2011]**
- 7. Global Governance of Extractive Resources [October 5, 2011]**
- 8. Russia, Central Asia / Pipeline Politics [October 12, 2011]**
- 9. Europe / Energy Security and Renewable Energy [October 19, 2011]**
- 10. Africa / US vs. China for Oil [October 26, 2011]**
- 11. China, India / Climate Change [November 2, 2011]**
- 12. Energy Poverty and Development [November 9]**
- 13. Transportation Efficiency and Fuel Alternatives [Friday, November 18, 2011]**  
**Site visit to Center for Applied Energy Research/Dr. Rodney Andrews**
- No Class (Thanksgiving) [November 23, 2011]**
- 14. Conservation, Alternative Energies, and the National Electrical Grid [November 30, 2011]**
- 15. Class presentations [December 7, 2011]**

#### **[6] GRADE COMPUTATION**

- Class participation - 25%**
- Assignments - 75% (25/25/25%)**

#### **Grading/Participation**

- Assignments will be graded based on your ability to cover the topics fully and logically.
- Assignments are expected on due date in class. Paper and electronic copies of each class assignment are expected.
  - For each day that an assignment is late, the grade will drop by 1 letter.

- Class participation grade will be based on mandatory attendance (no absences unless approved in advance by instructor), and active (speaking) participation in the class. In addition, to get a maximum participation grade:
  - Students will do the mandatory readings, and stay abreast of energy security current events in the local papers and/or in the national news.
  - Laptops are permissible as long as they are used strictly for class note taking, though the instructor reserves the right to change this policy during the semester.
  - If a student is not participating in class discussions, instructor will send an email to the student to encourage participation. A second email will result in a letter drop in the participation grade.
- Consider participating in the UKY Energy Club events, including weekly presentations and field trips. Available on Facebook: <http://www.facebook.com/pages/Kentucky-Energy-Club/164695140233200?v=info>

### Assignments:

- Assignment 1: Write a 2-3 page policy memo from the Secretary of Energy to the President of the United States arguing whether the President should or should not be concerned about “peak oil” and why. Support your argument with data. Details of memo outline to be provided in class. See class readings for week 2. See also Department of Energy, *Peaking of World Oil Production: Impacts, Mitigation & Risk Management* (the Hirsch report), [http://www.netl.doe.gov/publications/others/pdf/oil\\_peaking\\_netl.pdf](http://www.netl.doe.gov/publications/others/pdf/oil_peaking_netl.pdf) and the Association for the Study of Peak Oil (ASPO), <http://www.peakoil.net/>. **Assignment 1 is due on September 21, 2011.**
- Assignment 2: Pick one of the major energy countries – China, Russia, India, Saudi Arabia, Iran, Iraq, Venezuela, Mexico, or Canada. Research their energy security issues, along with energy/climate change issues, and then discuss how these issues affect their national security relationships with the US, and/or others on the world stage, as appropriate. Research paper should be about 15 pages double spaced including references. **Assignment 2 is due November 9, 2011.**
- Assignment 3: Over the course of the semester, you will be drafting a 5 page think tank style memo (including 1-page executive summary). You will outline your vision for a new U.S. national energy security strategy. The plan will include a strategic goal, ways that goal can be implemented, and possible means for implementing your goal (i.e., incentives, programs, international agreements, etc.)

**Assignment 3 is due December 7, 2011. You will present your idea to the class; use of power point is encouraged.**

## **[7] READING LIST**

### **Required Reading**

- Luft, Gal and Anne Korin, editors, *Energy Security Challenges for the 21<sup>st</sup> Century*, Praeger Security International, 2009. **Hereinafter referred to as Luft**
- Orttung, Robert, Jeronim Perovic and Andreas Wenger, editors, *Energy and the Transformation of International Relations: Toward a New Producer-Consumer Framework (Oxford Institute for Energy Studies)* **Hereinafter referred to as Orttung.**
- Pascual, Carlos and Jonathan Elkind, editors, *Energy Security: Economics, Politics, Strategies and Implications*, Brookings Institution Press, 2010. **Hereinafter referred to as Pascual**

### **Background Reading**

- Goldwyn, David L. and Jan H. Kalicki, eds, *Energy and Security: Toward a New Foreign Policy Strategy*, Baltimore, MD: Johns Hopkins University Press, 2005. This is an excellent text and may be of value to you to understand the energy policies of international energy politics.
- Parra, Francisco, *Oil Politics: A Modern History of Petroleum*, I.B. Tauris, 2004 (2010 paperback)
- Yergin, Daniel, *The Prize*, NY: Free Press, 1991. **Hereinafter referred to as Yergin.**
- Margonelli, Lisa, *Oil on the Brain: Petroleum's Long, Strange Trip to Your Tank*, Broadway Books, 2007.

### **Recommended Viewing**

*The Prize*, based on Daniel Yergin's book of the same name. PBS mini-series, 7 episodes of about 50 minutes each in length.

Available at: <http://video.google.com/videoplay?docid=3602293093015423860#>

## **[8] RELEVANT REFERENCES**

You should monitor at least the following academic journals, all of which contain relevant articles. Depending on your own interests, you will also need to monitor the relevant area studies journals.

Baker Institute, Energy Forum Research, <http://www.rice.edu/energy/research/>  
CIA “The World Fact Book”, <https://www.cia.gov/library/publications/the-world-factbook/index.html>  
CNA, Powering America’s Defense, Energy and the Risks to National Security, May 2009, <http://www.cna.org/nationalsecurity/energy/>  
Council on Foreign Relations, Energy and Environment  
<http://www.cfr.org/publication/20511/energyenvironment.html?breadcrumb=%2Fissue%2F17%2Fenergyenvironment>  
Energy Information Agency – Country Analysis Briefs. <http://www.eia.doe.gov/cabs/>  
Meena Palaniappan and Peter H. Gleick, Peak Water,  
<http://www.worldwater.org/www/data20082009/ch01.pdf>  
Cambridge Energy Resource Associates,  
<http://www.cera.com/aspx/cda/public1/home/home.aspx>  
Energy Policy Research Foundation, Inc., [http://eprinc.org/?page\\_id=58](http://eprinc.org/?page_id=58)  
Harvard University, Belfer Center, Energy Technology Innovation Policy  
[http://belfercenter.ksg.harvard.edu/project/10/energy\\_technology\\_innovation\\_policy.html](http://belfercenter.ksg.harvard.edu/project/10/energy_technology_innovation_policy.html)  
International Energy Agency: <http://www.iea.org/>  
Oil Drum Blog: <http://www.theoil Drum.com/>  
Oxford Institute for Energy Studies, <http://www.oxfordenergy.org/research.shtml>  
Stanford, Precourt Center for Energy Research, <http://pie.stanford.edu/>  
White House Blog: Energy and the Environment:  
<http://www.whitehouse.gov/blog/issues/Energy-%2526-Environment>  
World Bank Energy:  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTENERGY2/0,,menuPK:4114636~pagePK:149018~piPK:149093~theSitePK:4114200,00.html>  
LexisNexis accesses hundreds of energy sources: Platts, Oil and Gas Journal, Petroleum Economist, among many others.

You should also keep up-to-date with contemporary events by reviewing the quality international press e.g., *The Economist* *Financial Times*, *International Herald Tribune*, *New York Times*, *Wall Street Journal*, *Washington Post* etc.

You should also be a regular viewer of Energy Now (<http://www.energynow.com/>).

Movies to be shown during the course (schedule permitting):

*Coal in Kentucky: A documentary*

*Gasland*, <http://www.gaslandthemovie.com/>

*Last Mountain*, <http://thelastmountainmovie.com/>

*Carbon Nation*, <http://www.carbonnationmovie.com/>

## [9] COURSE SCHEDULE

### **Week 1 (24 August) Why is Energy a National Security Issue?**

- What is energy security for consumers versus producers?
- How are energy and the environment interlinked?

Luft, chps. 1, 10 and 22

Orttung, chps. 1 (Orttung et al) and 2 (Perovic)

Pascual, chp. 6 (Elkind)

Alan Dupont, “The Strategic Implications of Climate Change, *Survival*, vol. 50, no. 3, pp. 29-54, June-July 2008

<http://www.iiss.org/publications/survival/survival-2008/year-2008-issue-3/>

Marilyn Brown, ‘Energy Myth One – Today’s Energy Crisis is ‘Hype’ in Sovacool and Brown, eds. *Energy and American Society – Thirteen Myths*, Springer 2007 (email).

Review White House *Blueprint for a Secure Energy Future*, March 11, 2011,  
[http://www.whitehouse.gov/sites/default/files/blueprint\\_secure\\_energy\\_future.pdf](http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf)  
<http://www.whitehouse.gov/issues/energy-and-environment>

### **Week 2 (31 August): Economics of Oil**

#### **Special Guest Lecturer: Professor Evan Hillebrand**

- What does the future hold for global oil supply?
- Should we be concerned that NOCs are increasing their share of a hydrocarbon sector previously led by IOCs?

Pascual, chp. 1 (Pascual and Zambetakis)

Kenneth S Deffeyes, *Beyond Oil: The View from Hubbert’s Peak*, 2006, chps 7, 8 and 9 (email)

Steve Yetiv, “The Chief Guarantor of Oil Stability”, chp. 4 in *Crude Awakenings*, 2004, pp 59-76 (email)

Eugene Golhz and Daryl Press, “Energy Alarmism: The Myths That Make Americans Worry About Oil”, April 5, 2007, (Email) or available at [www.cato.org](http://www.cato.org), search under Gholz.

Baker Institute Policy Report, “The Changing Role of National Oil Companies in International Energy Markets,” Number 35, April 2007.  
[http://www.rice.edu/energy/publications/studies/BI\\_Study\\_35-1.pdf](http://www.rice.edu/energy/publications/studies/BI_Study_35-1.pdf)

### **Week 3 (7 September) Modelling Energy Security**

**Special Guest Lecturer: Aron Patrick**, Program Manager

Department for Energy Development and Independence, ‘Modelling Energy Security: Case Study of Kentucky’

Watch: *Coal in Kentucky: A documentary*. A production of the Via Center and the College of Engineering of the University of Kentucky, Executive Producer W. Brent Seales.

### **Week 4 (14 September): the US Military and Energy**

- How does the oil dependence of the U.S. military affect national security?
- Can the U.S. military lead an energy transformation?

Report of the Defense Science Board Task Force on DoD Energy Strategy, “More Fight, Less Fuel”, February 2008, pp. 1-22.  
<http://www.acq.osd.mil/dsb/reports/ADA477619.pdf>

Amory Lovins, DoD’s Energy Challenge as a Strategic Opportunity, JFQ, Issue 57, 2<sup>nd</sup> quarter, 2010, <http://www.ndu.edu/press/lib/images/jfq-57/lovins.pdf>

CNA Analysis & Solutions, *Powering America’s Defense: Energy and the Risks to National Security*, May 2009, pp. 1-24, <http://www.cna.org/reports/energy>

James Bartis and Lawrence Bibber, ‘Alternative Fuels for Military Applications,’ RAND, 2011 (read Summary),  
[http://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND\\_MG969.pdf](http://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND_MG969.pdf)

Matt Hourihan and Matthew Stepp, 'Lean, Mean and Clean, Energy Innovation and the Department of Defense,' ITIF, March 2011, <http://www.itif.org/files/2011-lean-mean-clean.pdf>

## **Week 5 (21 September) The Americas and Energy Politics**

**Note: Assignment 1 is due**

- How important are energy relations between the U.S. and Latin America?
- Are Canada and the U.S. sacrificing climate concerns in return for gains from oil sands production?
- Should Latin America and the Caribbean integrate their energy systems?

Luft, chp 9 (Forman and Moreira)

Ortting, chp. 7 (Tissot)

World Energy Council, Regional Energy Integration in Latin America and the Caribbean, December 2008, [http://www.worldenergy.org/documents/lac\\_executive\\_summary.pdf](http://www.worldenergy.org/documents/lac_executive_summary.pdf)

Michael Levi, 'The Canadian Oil Sands: Energy Security vs. Climate Change, Council on Foreign Relations, May 2009, <http://www.cfr.org/canada/canadian-oil-sands/p19345>

Isidro Morales, 'The Energy Factor in Mexico-U.S. Relations.' Baker Institute, April 29, 2011, <http://bakerinstitute.org/publications/EF-pub-MoralesFactor-04292011.pdf>

Securing America's Future Energy, 'Eastern Gulf of Mexico Oil and Gas Exploration and Military Readiness,' Issue Brief, January 2010, [http://www.collinscenter.org/resource/resmgr/century\\_com\\_oil\\_drilling/safe\\_report\\_on\\_military-gulf.pdf](http://www.collinscenter.org/resource/resmgr/century_com_oil_drilling/safe_report_on_military-gulf.pdf)

## **Week 6 (28 September): The Persian Gulf and Resource Wars**

- How has OPEC, in particular Saudi Arabia, affected the price of oil?
- What types of conflict are likely to occur over hydrocarbons?

Pascual, chp. 2 (Maloney) and chp. 3 (O'Hanlon)



Luft, chp. 4 (Klare); chp. 5 (Fettweis); chp. 6 (Jaffe)

Orttung, chp. 4 (Fattouh)

Robert Ebel, "Geopolitics and Energy in Iraq: Where Politics Rule," CSIS Report, August 5, 2010, pp. 1-54  
[http://csis.org/files/publication/I00730\\_Ebel\\_IraqGeopolitics\\_Web.pdf](http://csis.org/files/publication/I00730_Ebel_IraqGeopolitics_Web.pdf)

Michael Ross, "Blood Barrels", *Foreign Affairs*, May/June 2008

David Victor and Rebuttals, "What Resource Wars", *The National Interest*, Nov/Dec 2007 and Jan/Feb, 2008

### **Week 7 (5 October): Global Governance of Extractive Resources**

- Are resource abundant states more or less prone to economic and democratic development?
- Describe the web of agreements, institutions, and stakeholders that attempt to secure energy supplies?
- Can oil be globally governed?

Florini (Pascual, chp. 7)

John Gould and Matthew Winters, "Betting on Oil: The World Bank's Attempt to Promote Accountability in Chad," *Global Governance*, Volume 17, Number 2, April-June 2011, pp. 229-246.

Jonathon di John, "Is there Really a Resource Curse?" *Global Governance*, Volume 17, Number 2, April-June 2011, pp. 167-184.

Terry L Karl. "Oil Led Development: Social, Political, and Economic Consequences," CDDRL Working Papers, Number 80, January 2007, pp 1-33.  
[http://cddrl.stanford.edu/publications/oiled\\_development\\_social\\_political\\_and\\_economic\\_consequences/](http://cddrl.stanford.edu/publications/oiled_development_social_political_and_economic_consequences/)

Hazel M. McFerson, "Extractive Industries and African Democracy: Can the "Resource Curse" be Exorcised?" *International Studies Perspectives*, Volume 11, Issue 4, November 2010, pp. 335-353.

Review Jeffrey D Sachs and Andrew M. Warner, "Natural Resource Abundance and Economic Growth", Center for International Development and Harvard Institute for

International Development Harvard University. Cambridge MA, November, 1997, JEL Classification: O4, Q0, F43, [http://www.cid.harvard.edu/ciddata/warner\\_files/natresf5.pdf](http://www.cid.harvard.edu/ciddata/warner_files/natresf5.pdf)

### **Week 8 (12 October): Russia, Central Asia and the Future of Natural Gas**

- Will liquefied natural gas be the “new oil”?
- What is the possibility of a Gas OPEC and how would it function?
- What is the future of Caspian based gas and why does it matter?

Luft, chp. 7 (Cohen)

Luft, chp. 8 (Cohen)

Luft, chp. 18 (Hurst)

Orttung, chp. 5 (Perovic and Orttung)

Ed Chow and Leigh E. Hendrix, NBR Report #23, September 2010, [http://csis.org/files/publication/1009\\_EChow\\_LHendrix\\_CentralAsia.pdf](http://csis.org/files/publication/1009_EChow_LHendrix_CentralAsia.pdf)

Review Amy Myers Jaffe and Ron Soligo, ‘Market Structure in the new gas economy: is cartelization possible? Stanford and Baker Energy Forum, May 2004, [http://iis-db.stanford.edu/pubs/20705/Gas\\_OPEC\\_final.pdf](http://iis-db.stanford.edu/pubs/20705/Gas_OPEC_final.pdf)

Review Martha Brill Olcott, “Russia, Central Asia and the Caspian: How Important is Energy and Security Trade-off?” Baker Institute, 2009, <http://www.bakerinstitute.org/publications/EF-pub-OlcottRussAsiaCaspEnergySecurity-050609.pdf>

### **Week 9 (19 October): Europe / Gas Dependency and Renewable Resources**

- What are the challenges to Europe meeting its energy security goals?
- Can Europe move beyond its dependency on Russian gas?
- Do Europe and the US share policy goals in addressing energy security and climate change?

Luft, chp. 11 (Rosner)

Orttung, Chp. 9 (Roberts)

K. Kaygusuz, O. Yuksek, O. and A. Sari, "Renewable Energy Sources in the European Union: Markets and Capacity," *Energy Sources*, Part B, 2, 2007, pp. 19-29.

Julianne Smith and Derek Mix, "The Transatlantic Climate Change Challenge", Washington Quarterly, Winter 2008,  
[http://www.twq.com/08winter/docs/08winter\\_smith.pdf](http://www.twq.com/08winter/docs/08winter_smith.pdf)

Review European Commission, "Renewable Energy Road Map: Renewable energies in the 21st century: building a more sustainable future", January 10, 2007.  
[http://ec.europa.eu/energy/energy\\_policy/doc/03\\_renewable\\_energy\\_roadmap\\_en.pdf](http://ec.europa.eu/energy/energy_policy/doc/03_renewable_energy_roadmap_en.pdf)

### **Week 10 (26 October): Africa / US vs. China for Oil**

- How have American and Chinese companies differed in their approaches to extracting natural resources?
- Is it inevitable that the US and China will remain on a collision course?
- Is a trilateral US-Africa-china agenda possible?

Pascual, chp. 4 (Downs)

Orttung, chp. 6 (Enfield)

Ghazvinian '*Untapped*': *the Scramble for Africa's Oil*, chps. 4 and 7 (email)

Luft, chp. 15 (Goldwyn)

### **Week 11 (2 November): China, India / Climate Change**

- How does China's use of oil, natural gas, and other energy sources affect world energy security?
- Likewise, how does India's quest for energy compete with China and the U.S?
- How affective will global governance be to mitigating climate change? Are China and India supporting or hindering these efforts?

Luft, chp. 13 (Howell) and chp. 14 (Carl)

Orttung, chp. 10 (Herberg) and chp. 11 (Madan)

Pascual, chp. 10 (Antholis)

National Intelligence Council, "India: the Impact of Climate Change to 2030," 2009,  
[http://www.dni.gov/nic/NIC\\_confreports.html](http://www.dni.gov/nic/NIC_confreports.html)

National Intelligence Council, “China: the Impact of Climate Change to 2030,” 2009,  
[http://www.dni.gov/nic/NIC\\_confreports.html](http://www.dni.gov/nic/NIC_confreports.html)

Review Michael Levi, Elizabeth Economy, Shannon O'Neil, and Adam Segal. Council on Foreign Relations. *Energy Innovation: Driving Technology Competition and Cooperation Among the U.S., China, India, and Brazil: (Executive Summary Only)*  
[http://www.cfr.org/publication/23321/energy\\_innovation.html](http://www.cfr.org/publication/23321/energy_innovation.html)

Review The Pew Center, *Climate Change 101*, January 2009 Update,  
<http://www.pewclimate.org/docUploads/Climate101-Complete-Jan09.pdf>

Review United Nations Framework Convention on Climate Change for Copenhagen and Cancun, December 2009 and November 2010 respectively, <http://unfccc.int/2860.php>.

## **Week 12 (9 November) Energy Poverty (show movie at 0930)**

**Note: Assignment 2 is due**

- What is energy poverty?
- Is energy poverty a security threat?
- What are the obstacles to alleviating energy poverty?

Rebecca J. Elias and David G. Victor, “Energy Transitions in Developing Countries: a Review of Concepts and Literature,” Stanford Working Paper #40, June 2005  
[http://pesd.stanford.edu/publications/energy\\_transitions\\_in\\_developing\\_countries\\_a\\_review\\_of\\_concepts\\_and\\_literature/](http://pesd.stanford.edu/publications/energy_transitions_in_developing_countries_a_review_of_concepts_and_literature/)

Allen Hammond et al., *The Next Four Billion*, Chapter 7 ‘The Energy Market’ March, 2007, [http://pdf.wri.org/n4b\\_chapter7.pdf](http://pdf.wri.org/n4b_chapter7.pdf)

Peng Wuyuan et al, ‘Energy for Sustainable Development,’ *The Journal of the International Energy Initiative*; Elsevier, Vol. 14, page(s) 238-244, September 2010,  
[http://iis-db.stanford.edu/pubs/23005/Energy\\_for\\_Sustainable\\_Dev\\_Peng.pdf](http://iis-db.stanford.edu/pubs/23005/Energy_for_Sustainable_Dev_Peng.pdf)

Fatih Birol, ‘A Place for Energy Poverty in the Agenda?’, *The Energy Journal*, Vol. 28, No. 3, 2007, <http://www.americancorners.or.kr/articlealert/enpq/en7046.pdf>

Douglas F. Barnes et al., ‘Modernizing Energy Services for the Poor,’ World Bank, December 2010 (Executive Summary and Chapters 1 and 5 only)  
<http://siteresources.worldbank.org/EXTENERGY2/Resources/EnergyForThePoor.pdf>

## **Week 13 (Friday, 18 November): Transportation Efficiency and Fuel Alternatives Visit to CAER and talk with Dr. Rodney Andrews**

- This discussion will focus on transportation needs, both public and individual, into the future.
- Which vehicle propulsion technologies – plug in hybrids, fully electrical vehicles, etc, offer the best chance for our future replacements?
- What are possible solutions to the transportation gridlock in the US?

Luft, chp. 19 (Werbos)

SAFE, 'Transportation Policies for America's Future,' February 9, 2011, (part 2 and 3 only) <http://www.secureenergy.org/policy/transportation-policies-america-s-future>

Electrification Coalition, 'Electrification Roadmap,' November 2009 (Executive Summary only) [http://www.electrificationcoalition.org/sites/default/files/SAF\\_1213\\_EC-Roadmap\\_v12\\_Online.pdf](http://www.electrificationcoalition.org/sites/default/files/SAF_1213_EC-Roadmap_v12_Online.pdf)

Joseph Romm, 'Energy Myth Four – the Hydrogen Economy is a Panacea to the Nation's Energy Problems' in Sovacool and Brown, eds. *Energy and American Society – Thirteen Myths*, Springer 2007 (email).

Jerry Taylor and Peter Van Doren, 'Energy Myth Five – Price Signals are Insufficient to Induce Efficient Energy Investment,' in Sovacool and Brown, eds. *Energy and American Society – Thirteen Myths*, Springer 2007 (email).

Review Data: IEA, 'Alternatives to Traditional Transportation Fuels 2009, April 2011, <ftp://ftp.eia.doe.gov/alternativefuels/afv-atf2009.pdf>

Review DOT's Strategic Plan, "New Ideas for a Nation on the Move", FY 2006-2011, <http://www.dot.gov/stratplan2011/index.htm>

Review vehicle technologies at the DOE EERE, <http://www.eere.energy.gov/>, and National Renewable Energy Lab site, <http://www.nrel.gov/vehiclesandfuels/>

**No Class: Thanksgiving (23 November)**

**Week 14 (16 November): Energy Conservation, Alternative Energies and the National Electrical Grid**

- Can energy conservation be the key to achieving greater energy security?

- What alternative electricity sources are most readily available and what can help make them scalable for a large market?
- What is the future for nuclear power?
- What is the “Smart Grid”, and how “smart” is it?

Luft, chp. 20 (Ferguson)

Orttung, chp. 3

Pascual, chp. 8 (Brown)

M.J.Bradley and Associates LLC, *Ensuring a Clean, Modern Electric Generating Fleet While Maintaining Electric System Reliability*, August 2010,  
<http://www.mjbradley.com/documents/MJBAandAnalysisGroupReliabilityReportAugust2010.pdf>

Rodney Sobin, ‘Myth Seven - Renewable Energy Systems Could Never Meet Growing Electricity Demand in America’ in Sovacool and Brown, eds. *Energy and American Society – Thirteen Myths*, Springer 2007 (email).

Review Bracken Hendricks, Sean Pool and Lisbeth Kaufman, ‘Low-carbon Innovation’, Center for American Progress, May 2011,  
[http://www.americanprogress.org/issues/2011/05/pdf/gcn\\_low\\_carbon\\_execsumm.pdf](http://www.americanprogress.org/issues/2011/05/pdf/gcn_low_carbon_execsumm.pdf)

Review *The Smart Grid: An Introduction*.  
[http://www.oe.energy.gov/DocumentsandMedia/DOE\\_SG\\_Book\\_Single\\_Pages\(1\).pdf](http://www.oe.energy.gov/DocumentsandMedia/DOE_SG_Book_Single_Pages(1).pdf)

Review technologies (Hydrogen, solar, wind, geothermal, others) at the DOE Energy Efficiency and Renewable Energy (EERE) Website <http://www.eere.energy.gov/>

Review current Energy Conservation information and incentives available through the Federal Government, <http://www1.eere.energy.gov/wip/index.html>

Review DOE ARPA high risk high reward energy research, <http://arpa-e.energy.gov/ProgramsProjects/Programs.aspx>

**Week 15 (7 December): Class presentations. Note: Assignment 3 is due.**