



Course Approval Form

For instructions see:

<http://registrar.gmu.edu/facultystaff/catalog-revisions/course/>

Action Requested:

☒ Create new course ☐ Inactivate existing course

☐ Modify existing course (check all that apply)

☐ Title ☐ Credits ☐ Repeat Status ☐ Grade Type

☐ Prereq/coreq ☐ Schedule Type ☐ Restrictions

☐ Other:

Course Level:

☐ Undergraduate

☒ Graduate

College/School: COS Department: ESP

Submitted by: Jennifer Sklarew Ext: X3-2012 Email: jsklarew@gmu.edu

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Subject Code: EVPP Number: 533 Effective Term: ☐ Fall ☒ Spring Year: 2016 ☐ Summer

(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Title: Current Banner (30 characters max w/ spaces) Energy Policy

New Energy Policy

Fulfills Mason Core Req? (undergrad only)

☐ Currently fulfills requirement

☐ Submission in progress

Credits: (check one) ☒ Fixed 3 ☐ Variable Repeat Status: (check one) ☒ Not Repeatable (NR) ☐ Repeatable within degree (RD) ☐ Repeatable within term (RT) Maximum credits allowed:

Grade Mode: (check one) ☒ Regular (A, B, C, etc.) ☐ Satisfactory/No Credit ☐ Special (A, B, C, etc. +IP) Schedule Type: (check one) ☒ Lecture (LEC) ☐ Lab (LAB) ☐ Recitation (RCT) ☐ Internship (INT)

☐ Independent Study (IND) ☐ Seminar (SEM) ☐ Studio (STU)

Prerequisite(s): Corequisite(s):

Restrictions Enforced by System: Major, College, Degree, Program, etc. (include code)

Instructional Mode: ☒ 100% face-to-face ☐ Hybrid: ≤ 50% electronically delivered ☐ 100% electronically delivered

Equivalencies: (check only as applicable)

☐ YES, course is 100% equivalent to:

☐ YES, course is being renumbered to/will replace the following:

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	Notes (List additional information for the course)
Discusses resource options in the context of 3E's: energy security, environment, and economics. Examines how these considerations apply to 3 P's developed by Jennifer Sklarew: priorities, politics, and process. Examines sustainability and environmental angles of resources, reasons for specific nations' policy choices, and possibilities for future energy policies. Considers how energy policies can create cooperation and conflict domestically and internationally.	

Indicate number of contact hours: Hours of Lecture or Seminar per week: 2.5 Hours of Lab or Studio:

When Offered: (check all that apply) ☐ Fall ☐ Summer ☒ Spring

Approval Signatures

Department Approval _____ Date _____ College/School Approval _____ Date _____

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Courses Only

Graduate Council Member _____ Provost Office _____ Graduate Council Approval Date _____

For Registrar Office's Use Only: Banner _____ Catalog _____

revised 6/22/15

Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC's reference. Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

FOR ALL COURSES (required)

Course Number and Title: EVPP533 Energy Policy

Date of Departmental Approval: October 6, 2015

FOR INACTIVATED/REINSTATED COURSES (required if inactivating/reinstating a course)

- Reason for Inactivating/Reinstating:

FOR MODIFIED COURSES (required if modifying a course)

- Summary of the Modification:
- Text before Modification (title, repeat status, catalog description, etc.):
- Text after Modification (title, repeat status, catalog description, etc.):
- Reason for the Modification:

FOR NEW COURSES (required if creating a new course)

- Reason for the New Course: No EVPP graduate course on energy policy currently exists, and many COS graduate students have requested a regularly offered course on this topic. Graduate students focusing on environmental policy are actively seeking programs that include energy policy as a key component, because they recognize that understanding energy policy and policymaking processes is crucial to a holistic understanding of environmental policy and related areas such as climate change, water policy, and food security.
 - Relationship to Existing Programs: Students in the Environmental Science and Policy program and the Earth Systems Science program are seeking a graduate level energy policy course. The course has been proposed for inclusion as a requirement for the Energy and Sustainability MAIS concentration.
 - Relationship to Existing Courses: No other graduate EVPP course on energy policy currently exists. The undergraduate version, EVPP432, has received strong student interest and positive feedback.
 - Semester of Initial Offering: Spring 2016
 - Proposed Instructors: Jennifer Sklarew and Dann Sklarew
 - Insert Tentative Syllabus Below
-

EVPP 533: Energy Policy

Instructor: TBD

Course description: Energy policy isn't just about allocation of energy resources. In this course, we will discuss resource options in the context of the 3E's: energy security, environment, and economics. We'll also examine how these considerations apply to 3 P's developed by Jennifer Sklarew: priorities, politics, and process. We'll look at the 3P's as frameworks for understanding how energy policymaking takes place. Through these three lenses, we'll examine the sustainability and environmental angles of various resources, reasons for specific nations' policy choices, and possibilities for future energy policies. These discussions will enable us to consider how energy policies can create cooperation and conflict domestically and internationally.

Course Learning Objectives:

- 1) Examine how energy systems form and change;
- 2) Evaluate potential of existing energy resources and policy options;
- 3) Characterize how energy policy is formulated;
- 4) Describe challenges energy policymakers face;
- 5) Compare and contrast how the parameters for 1-4 vary for distinct jurisdictions (i.e., various nations, states, municipalities); and
- 6) Assess what these 5 issues mean for local, national, and international energy cooperation and conflict.

Weekly Learning Objectives:

Derived from the above, we'll also have learning objectives for each week that help us to move toward our course learning objectives.

Required text:

Smil, Vaclav. 2010. *Energy Transitions: History, Requirements, Prospects*. Praeger Press.

Optional:

Richard Heinberg and Lerch, Daniel, ed. *The Post Carbon Reader-Managing the 21st Century's Sustainability Crises*: Watershed Media/ University of California Press, 2010.

Assignments:

1) Article for discussion: At least once during the semester, each student will find one article (newspaper, journal, magazine, website posting, etc.) on the session topic for discussion in class. Please send it to me by midnight the Saturday before class so I can distribute it for everyone to read before class. Be prepared to lead a 15-minute discussion of the article in class, including a brief summary of the article and how it relates to that day's topic, and at least two questions for the class to discuss.

2. Semester project and interim assignments: The overall assignment is to examine how a particular city, state, or country determines its energy portfolio (the balance of energy supply sources and demand-side measures).

Questions to answer:

1. Does the current energy portfolio maximize all 3E's?
2. Who/what are the key stakeholders, motivations, and challenges?
3. What would the optimal energy portfolio for this area look like, and what challenges to its realization exist?

4. If the area already has an optimal portfolio, what lessons can we learn from their example?

Divided into manageable pieces due about once a month.

- a. 2nd week: Choose a city, state or country for your project.
- b. 4th week: Energy profile of the country, state or city and a list of criteria for choosing the best energy portfolio, as well as a list of references. (5-7 pages)
- c. 9th week: Roadmap to get to that portfolio, challenges facing it, and a list of references. (5-7 pages)
- d. 12th week: Analyze how the 3Ps and 3Es apply to the country's, state's, or city's energy system, and how they addressed/could address challenges to achieve change. (5-7 pages)
- e. 15th week: Turn in 1) final papers incorporating revision of all of the interim assignments, including revisions to the roadmaps based on what you've learned about challenges; and 2) presentation slides.

3. **Presentation:** At the end of the semester, each student must give a short presentation explaining the results of the semester project. More details will be provided later in the semester. Everyone will turn in their presentations on the last day of class, but we'll spread the presentations over two sessions: the last week of class, and the final exam day.

4. **Final Exam:** A take-home final exam will cover the main topics discussed in the course.

Deadlines: In fairness to all students, I will lower your grade by one letter grade for each week that the paper is late, starting from the deadline. I.e., if you turn in your paper after the deadline but before the next class, it will be downgraded by one letter grade.

Class participation/Group discussion: Aside from the textbook readings, I will either email the readings or links to them or post them on blackboard, along with questions for you to consider while reading. We'll discuss these questions in class. If everyone demonstrates that they have done the readings and absorbed the concepts embodied in them each week, I won't need to give a final exam.

Attendance: If you need to miss class due to illness, travel, family obligations, etc., please notify me ahead of time via email. **To receive credit for the missed class, please choose two of the questions on the readings and email your responses to me before the next class.** If you have an unexcused absence and do not send answers to the questions, you will receive a zero for that day. If you have an excused absence but do not answer the questions, the class will not count toward your grade. If you decide to drop the course, please complete the necessary paperwork to avoid an automatic F at the end of the semester.

Basis of Grading

Class participation	10%
Discussion Leadership	5%
Three Policy Paper Interim Assignments	15% each
Policy Paper	15%
Presentation	15%

Final Exam: 10%

Grade table (General grading criteria for writing assignments, class participation and presentation will be provided separately, and specific criteria for each assignment will be provided during the semester.)

Grade	Percent
A	93-100%
A-	90-92.9%

B+	87-89.9%
B	83-86.9%
B-	80-82.9%
C+	77-79.9%
C	70-76.9%
D	60-69.9%
F	<60%

Plagiarism Statement:

What is it? Plagiarism means using the exact words, opinions, or factual information from another person or source without giving that person or source credit.

Plagiarism and the Internet: Copyright rules also apply to users of the Internet who cite from Internet sources. Information and graphics accessed electronically must also be cited, giving credit to the sources. This material includes but is not limited to e-mail (don't cite or forward someone else's e-mail without permission), newsgroup material, and information from Web sites, including graphics. Even if you give credit, you must get permission from the original source to include any graphic that you did not create on your web page. Shareware graphics are not free. Freeware clipart is available for you to freely use. If the material does not say "free," assume it is not. Putting someone else's Internet material on your web page is stealing intellectual property. Making links to a site is currently acceptable, but getting permission is strongly advised, since many Web sites have their own requirements for linking to their material. (Source: <http://mason.gmu.edu/~montecin/plagiarism.htm>)

How to avoid it? Authors must credit original sources through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes; a listing of books and articles is not sufficient. Direct quotations always require citations. So do paraphrases and summaries of opinions or factual information formerly unknown to the writers or which the writers did not discover themselves. Exceptions include factual information that can be obtained from a variety of sources; the writers' own insights or findings from their own field research; and what has been termed common knowledge. Common knowledge is sometimes difficult to determine, so feel free to ask. Work that requires citations is not limited to text. Templates, data (facts/figures) for charts, and even cartoons used in presentations require citations! If you are uncertain about whether information should be cited, please cite to be safe, or ask me before turning in your work.

Why avoid it? Plagiarism is a violation of Mason's Honor Code:

<http://www.gmu.edu/facstaff/handbook/aD.html> Plagiarism also reflects poorly on the intellectual capability of the person plagiarizing, and it is unfair to the original source of the plagiarized material. It also will earn you a failing grade in this class. I know professors who have failed students for plagiarism. Please don't turn me into one of them.

General Plan for Class Schedule

Class discussion of readings and article of the week: about 75 minutes

Break: about 10 minutes. Feel free to bring power bars or other fuel sources. ☺

Class lecture by instructor or guest speaker and discussion of lecture: 1 hour

Discussion of applications to projects: 10 minutes

Lead-in to next class: 5 minutes

Session Topics and Readings:

I. WHY energy policy matters: Priorities

Week 1: Overview and syllabus review

Session overview: We'll discuss energy systems, as well as the elements of energy policymaking and policy.

a. What is an energy system?

Readings:

1. Smil, Vaclav. 2010. *Energy Transitions: History, Requirements, Prospects*. Praeger Press. Chapter 1 (p. 1-24)

Questions: 1) what characteristics define an energy system? 2) what does Smil say about the importance of efficiency in energy systems? 3) What are some of the requirements for energy system infrastructures, and what are some of the challenges they pose? 4) What do the examples Smil offers say about the motivators and challenges associated with energy system transitions?

2. International Energy Agency. 2013. *IEA World Energy Outlook 2013*. Executive Summary. http://www.iea.org/media/executivesummaries/WEO_2013_ES_English_WEB.pdf

Questions: 1) What energy system complexities and challenges does the IEA world energy outlook reflect? 2) What roles do energy security, environment and economics play?

b. Policy vs. Policymaking

- The Three P's and 1 R: Priorities, Politics, Process, and Resources
- The 3E's: energy security/independence, environment, economics

Articles for discussion:

<http://www.therepublic.com/view/story/e222f509c2f6467eaa2e8883b8923ba5/MI--Energy-Policy-Conservatives>

<http://www.businessweek.com/news/2014-01-17/obama-energy-policy-faulted-by-environmentalists-citing-keystone>

Questions: 1) what incentives drive these groups? 2) why might they impact energy, and what challenges might they face?

Week 2: Environmental Considerations

Session overview: How does our energy policy reflect or conflict with environmental priorities? We'll discuss topics including climate change, pollution and waste, land conservation, and ecosystem impacts.

Readings:

Required

1. Pacala, S. and R. Socolow (2004) Stabilization wedges: Solving the Climate Problem for the next 50 years with current technologies, *Science* 305: 968-972.

2. <http://www.whitehouse.gov/energy/our-environment#energy-menu> Read the whole page, and also the Memorandum of Understanding on Environmental Justice (hyperlink on this page, but I will also send as a PDF).

3. United Nations Environment Programme. 2006. The Energy and Air Pollution Challenge. http://www.unep.org/training/programmes/Instructor%20Version/Part_2/Activities/Innovations_and_Technology/Energy/Supplemental/Energy_and_Air_Pollution_Challenge.pdf

4. The National Academies. 2010. Chapter 5, Environmental Impacts of Renewable Electricity Generation. *Electricity from Renewable Resources: Status, Prospects, and Impediments*. Washington, DC: The National Academies Press. p.202-228.
http://www.nap.edu/openbook.php?record_id=12619&page=195#p2001a9a59970195001
5. Schaul, Jordon Carlton. 2013. The Impact of Energy Development on the Environment: A Look at Wildlife with Dr. Michael Hutchins. National Geographic. October 7.
<http://newswatch.nationalgeographic.com/2013/10/07/the-impact-of-energy-development-on-the-environment-a-look-at-wildlife-with-dr-michael-hutchins/>

Questions: 1) How do different stakeholders' environmental concerns vary? 2) Do U.S. energy policies cause conflicts among the 3 E's? 3) Why do we need an environmental justice MOU?

Article for discussion (if we have time after Cornelia's):

Daly, Matthew. Kerry: No Rush to Decide on Keystone XL Pipeline. Associated Press. January 17, 2014.

<http://abcnews.go.com/Politics/wireStory/kerry-rush-decide-keystone-xl-pipeline-21576397>

Questions: 1) What purposes might the Environmental Impact Statement serve? 2) What priorities does the Keystone XL pipeline support or hinder for Canada and the U.S., and how?

Optional

Berkhout, Frans. 2002. Technological regimes, path dependency and the environment. *Global Environmental Change* 12, no. 1 (4): 1-4.

Week 3: Economics

Session overview: Why does economics matter, and what tools are used to shape energy policy? We'll discuss supply and demand side energy economics, regulations and incentives, and reasons to choose one option over another.

Readings:

Required:

1. Smil, Chapter 3.
2. National Journal, April 25, 2009 "What Exactly is a Feed-In Tariff?" pp. 36-37, http://www.nationaljournal.com/njmagazine/nj_20090425_3763.php
3. Resources for the Future. Feed-In Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies.
<http://rfflibrary.wordpress.com/2013/06/03/feed-in-tariff-a-policy-tool-encouraging-deployment-of-renewable-electricity-technologies/>
4. Walls, Margaret. December 2012. *Policies to Encourage Home Energy Efficiency Improvements: Comparing Loans, Subsidies and Standards*. Introduction and concluding remarks, p. 1-4 and 27-29. (The rest of the paper is optional reading.)
5. Cropper, Maureen, Alexander Limonov, Kabir Malik, and Anoop Singh. February 2012. *Estimating the Impact of Restructuring on Electricity Generation Efficiency: The Case of the Indian Thermal Power Sector*. Introduction, Institutional Background, and Conclusions. P. 1-6 and 19-20.

6. Resources for the Future, Center for Climate and Electricity Policy. 2013. Considering a Carbon Tax: Frequently Asked Questions. http://www.rff.org/centers/climate_and_electricity_policy/pages/carbon_tax_faqs.aspx

7. Obama, Barack. 2014. State of the Union. January 28. Paragraphs on energy, p. 3. (PDF)

8. Morris, Adele. 2012. Clean Energy: Policy and Priorities. The Brookings Institution. <http://www.brookings.edu/research/papers/2012/01/clean-energy-morris>

Questions: 1) Why choose carrots vs. sticks (effectiveness, benefits and challenges of each)? 2) How is India's environment for electricity restructuring different from that of the U.S.? 3) How do different stakeholders prioritize economics?

Optional:

Pacific Northwest National Laboratory. 2002. Utilities, Deregulation and Restructuring of U.S. Electricity Markets.

<http://www.purdue.edu/discoverypark/energy/assets/pdfs/History.pdf>

Borenstein, Severin and James Bushnell. Electricity Restructuring: Deregulation or Reregulation? *Regulation*, vol. 23, no. 2. 46-52.

<http://www.ucei.berkeley.edu/ucei/bushnell/cato.pdf>

II. HOW energy policies are decided: politics and process

Week 4: Politics

Session overview: How does politics influence energy policy? We'll discuss the roles of local interests, government relationships with the private sector and public, and intragovernmental and intergovernmental dynamics.

ASSIGNMENT DUE: Energy profile of the country, state or city and a list of criteria for choosing the best energy portfolio, as well as a list of references.

Readings:

Required

1. Geri, Laurance and David McNabb. 2011. *Energy Policy in the U.S.: Politics, Challenges, and Prospects for Change*. CRC Press. P. 84-98.

2. Hess, David J. 2013. Sustainability transitions: A political coalition perspective. *Research Policy*. November. <http://dx.doi.org/10.1016/j.respol.2013.10.008>

3. Tucker, Aviezer. 2013. The New Power Map-World Politics after the Boom in Unconventional Energy. *Foreign Affairs*. January.

<http://www.foreignaffairs.com/articles/138597/aviezer-tucker/the-new-power-map?page=show>

Questions: 1) How does politics influence prospects for energy transitions? 2) How do different stakeholders influence energy policy?

Optional:

Frank N. Laird (2013): Against Transitions? Uncovering Conflicts in Changing Energy Systems, *Science as Culture*, 22:2, 149-156.

Week 5: Process

Session Overview: How does the energy policy process work at different levels and in different nations? What are the roles of the government, public and private sector?

Readings:

Required:

1. Jordan, Matt, Dawn Manley, Valerie Peters and Ron Stoltz. 2012. The Goals of Energy Policy: Professional Perspectives on Energy Security, Economics and the Environment. <http://energy.sandia.gov/wp/wp-content/gallery/uploads/goalsofenergypolicysandia.pdf>
2. Bipartisan Policy Center. 2012. The Executive Branch and National Energy Policy: Time for Renewal. http://bipartisanpolicy.org/sites/default/files/BPC_Governance_Report_0.pdf
3. Kaufmann, John. 2010. CITIES, TOWNS, AND SUBURBS: Local Government in a Time of Peak Oil and Climate Change. *The Post Carbon Reader*.
4. Federal Energy Regulatory Commission. 2013. History of FERC. <http://www.ferc.gov/students/ferc/history.asp>

Questions: 1) What kinds of stakeholders play a role in the energy policymaking process? 2) How do politics and the policymaking process interact to affect energy system transitions?

Optional:

Kemp, Rene. 1994. Technology and the Transition to Environmental Sustainability: The Problem of Technological Regime Shifts. *Futures* 26: 1023-1046.

Lucas, Nigel. 1985. *Western European Energy Policies: A Comparative Study of the Influence of Institutional Structures on Technical Change*. Oxford University Press, USA, June 13.

Truffer, Bernhard, Harald Rohrer, and Jochen Markard. "The Analysis of Institutions in Technological Innovation Systems - A Conceptual Framework Applied to Biogas Development in Austria." Paper presented at the DRUID Summer Conference. Copenhagen, Denmark. June 16-20, 2009.

III. WHAT factors affect demand

Week 6: Conservation and Efficiency

Session Overview: How do energy policies incorporate conservation and efficiency policies, and how can they impact energy supply policy decisions?

Readings:

1. McKinsey & Company. 2009. [Executive Summary](#). *Unlocking Energy Efficiency in the U.S. Economy*. P. 1-14.
2. Dixon, Robert K., Elizabeth McGowan, Ganna Onysko, Richard M. Scheer. 2010. US Energy Conservation and Efficiency Policies: Challenges and opportunities. *Energy Policy* 38: 6398–6408.
3. Fitzpatrick, Michael. "Japan's green energy evolution." CNNMoney. September 23, 2013: <http://tech.fortune.cnn.com/2013/09/23/japan-energy/>
4. Gillingham, Kenneth, Richard G. Newell, and Karen Palmer. 2009. *Energy Efficiency Economics and Policy*. Resources for the Future.
5. Brown, Hillary. 2010. CITIES, TOWNS, AND SUBURBS: Toward Zero-Carbon Buildings. *The Post Carbon Reader*.

6. deLaski, Andrew. 2014. DOE's New Power Supply Standards Are a Big Win for Consumers and the Environment. American Council for an Energy Efficient Economy. February 3.
<http://aceee.org/blog/2014/02/doe-s-new-power-supply-standards-are->

Questions: 1) What challenges do conservation and efficiency policies face? 2) Why would stakeholders support or oppose conservation and efficiency policies?

IV. WHAT energy sources are currently available: Supply

Week 7: Fossil Fuels I: Oil and Natural Gas

Session Overview: How are oil and natural gas policies different in producing and importing countries? How have trends changed over time, and what role do the 3Es play?

Readings:

Required:

1. Cambanis, Thanassis. 2013. American energy independence: the great shake-up: It's coming soon—and geopolitically, it might be more complicated than we thought. *The Boston Globe*. May 26.

<http://www.bostonglobe.com/ideas/2013/05/25/american-energy-independence-great-shake/pO9Lsad4cVQvjdpYxMI1DO/story.html>

2. "About Tar Sands." (2012), <http://ostseis.anl.gov/guide/tarsands/index.cfm>

3. "What Is Shale Gas and Why Is It Important?" December 5, 2012.

http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm.

4. Krupnik, Alan. June 2013. Managing the Risks of Shale Gas: Key Findings and Further Research.

<http://www.rff.org/RFF/Documents/RFF-Rpt-ManagingRisksofShaleGas-KeyFindings.pdf>

5. Griswold, Eliza. 2011. The Fracturing of Pennsylvania. *The New York Times*. November 17.

<http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html?pagewanted=all&r=0>

6. Norse, Elliott A. and John Amos. Norse, Elliott A.; Amos, John (November 2010). "Impacts, Perception, and Policy Implications of the BP/Deepwater Horizon Oil and Gas Disaster". *Environmental Law Reporter* **40** (11): 11058–11073. http://mcbi.marine-conservation.org/publications/pub_pdfs/Norse-and-Amos-2010.pdf

Questions: 1) Which of the 3E's are federal government, state government, and local stakeholders prioritizing, and how do the 3P's impact our oil and gas policies? 2) Does our policy cause conflicts among the 3 E's?

Optional:

Schroeck, Nicholas J. and Karisny, Stephanie, Hydraulic Fracturing and Water Resource Management in the Great Lakes (May 18, 2013). Case Western Reserve Law Review, Vol. 63, No. 4, 2013. Available at SSRN: <http://ssrn.com/abstract=2343576> (21 pages)

Jacoby, H. D., F. M. O'Sullivan, et al. 2012. ["The Influence of Shale Gas on U.S. Energy and Environmental Policy." \(PDF - 1.2MB\)](#) *Economics of Energy & Environmental Policy* 1, no. 1: 37–51.

Week 8: Spring Break: No Class

Week 9: Fossil Fuels II: Coal

Session Overview: How are coal policies different in producing and importing states and countries? How have trends changed over time, and what role do the 3Es play?

ASSIGNMENT DUE: Roadmap to get to your ideal portfolio, challenges facing it, and a list of references.

Readings:

Required:

1. "Old King Coal." *The Economist*, February 25, 2012.
2. "Coal in the Rich World-the Mixed Fortunes of a Fuel." *The Economist*, January 5, 2013.
3. Intergovernmental Panel on Climate Change. 2005. IPCC Special Report: Carbon Dioxide Capture and Storage, Summary for Policymakers, a Special Report of Working Group III of the Intergovernmental Panel on Climate Change Montreal, Canada: September 22-24. http://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf
4. Opower solutions page: <http://opower.com/solutions> Skim the company's activities.

Questions: 1) which of the 3E's are we prioritizing, and how do the 3P's impact our coal policies? 2) Does our policy cause conflicts among the 3 E's?

Optional:

1. Soren Anderson and Richard Newell. 2004. Prospects for Carbon Capture and Storage Technologies, *Annual Review of Environmental Resources* 29: 109-142. (PDF)
2. Zwaan, Jennie C. Stephens and Bob van der. 2008. Co2 Capture and Storage (Ccs): Exploring the Research, Development, Demonstration, and Deployment Continuum. <http://belfercenter.ksg.harvard.edu/files/stephensandvanderzwaan200508.pdf>

Week 10: Nuclear Power

Session Overview: How have nuclear power policies changed since the TMI, Chernobyl, and Fukushima accidents? What role do the 3Es play?

Readings:

Required:

1. Mycle Schneider, Antony Froggatt et al. World Nuclear Industry Status Report 2013-14. p. 4-10. <http://www.worldnuclearreport.org/IMG/pdf/20130716msc-worldnuclearreport2013-lr-v4.pdf>
2. "The Official Report of the Fukushima Nuclear Accident Independent Investigation Commission." P. 9-23. http://www.nirs.org/fukushima/naaic_report.pdf
3. The National Academies. *Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia*. Washington, DC: The National Academies Press, 2012. Summary and Non-technical Summary. p. 1-27. http://www.nap.edu/openbook.php?record_id=13266&page=1

Questions: 1) which of the 3E's are we prioritizing, and how do the 3P's impact our nuclear policies? 2) Does our policy cause conflicts among the 3 E's?

Week 11: Alternative Fuels: Solar and Wind

Session Overview: How have solar and wind policies affected expansion of these technologies, and what challenges do they face? What role do the 3Es play?

Readings:

Required:

1. <http://americaspowerplan.com/>
2. Stefes, Christoph, and Frank N. Laird. 2010. Creating Path Dependency: The Divergence of German and

U.S. Renewable Energy Policy. *SSRN eLibrary* (August 28).
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1667615.

3. Mai, T.; Sandor, D.; Wiser, R.; Schneider, T (2012). Renewable Electricity Futures Study: Executive Summary. NREL/TP-6A20-52409-ES. Golden, CO: National Renewable Energy Laboratory. Conclusions, p. 30-31. http://www.nrel.gov/analysis/re_futures/
4. Komendantova, Nadejda, Anthony Patt, Lucile Barras, and Antonella Battaglini. 2012. Perception of risks in renewable energy projects: The case of concentrated solar power in North Africa. *Energy Policy*, vol. 40: 103-109.
5. Zhang, Sufang, Philip Andrews-Speed, and Xiaoli Zhao. 2013. Political and institutional analysis of the successes and failures of China's wind power policy. *Energy Policy*, vol. 56: 331-340.
6. Parkinson, Giles. 2014. Abbott's myths on wind and solar energy blown away. *EchoNet Daily*. March 10. <http://www.echo.net.au/2014/03/abbotts-myths-wind-solar-energy-blown-away/>

Questions: 1) which of the 3E's are the U.S. and Germany prioritizing, and how do the 3P's impact our solar and wind power policies? 2) What institutional issues are U.S. policymakers considering? 3) What challenges do these technologies face in different countries?

Optional:

1. Policy Blueprint for a Renewable Energy Future: America's Power Plan, September 23, 2013. <http://www.onlinetes.com/policy-blueprint-for-renewable-energy-future-hot-topic-92313.aspx>
2. Foxon, T. J., R. Gross, A. Chase, J. Howes, A. Arnall, and D. Anderson. 2005. UK innovation systems for new and renewable energy technologies: drivers, barriers and systems failures. *Energy Policy* 33, no. 16: 2123-2137.
3. Lewis, J. I. 2007. Technology Acquisition and Innovation in the Developing World: Wind Turbine Development in China and India. *Studies in comparative international development* 42: 208-232.

Week 12: Alternative Fuels: Hydro, Biomass, Geothermal, CHP, and Waste-to-Energy

Session Overview: How have hydro, biomass, geothermal, CHP and waste-to-heat policies affected expansion of these technologies, and what challenges do they face? What role do the 3Es play?

Readings:

Required:

1. U.S. Environmental Protection Agency. 2013. Hydroelectricity. <http://www.epa.gov/cleanenergy/energy-and-you/affect/hydro.html>
2. Institute for Energy Research. 2013. Biomass. <http://www.instituteforenergyresearch.org/energy-overview/biomass/>
3. Caputo, Jesse. 2009. *Sustainable Forest Biomass: Promoting Renewable Energy and Forest Stewardship*. Environmental and Energy Study Institute. http://www.eesi.org/070609_sustainableforestbiomass
4. Doris, Elizabeth, Claire Kreycik, and Katherine Young. 2009. *Policy Overview and Options for Maximizing the Role of Policy in Geothermal Electricity Development*. National Renewable Energy Laboratory. http://www1.eere.energy.gov/geothermal/pdfs/policy_overview.pdf

5. Fehrenbacher, Katie. 2013. A Quiet Breakthrough in Geothermal Energy. *Bloomberg Businessweek*. January 25.
<http://www.businessweek.com/articles/2013-01-25/a-quiet-breakthrough-in-geothermal-energy>
6. California Energy Commission. 2014. Combined Heat & Power Energy.
<http://www.energy.ca.gov/research/renewable/chp.html>
7. American Council on Renewable Energy. 2014. Waste Heat to Power.
<http://www.acore.org/resources/renewable-energy-info/36-uncategorized-pages28/3691-waste-to-heat-power>

Questions: 1) Which of the 3E's are we prioritizing, and how do the 3P's impact our hydro, biomass and geothermal policies? 2) Does our policy cause conflicts among the 3 E's? 3) What challenges do these technologies face?

Week 13: Transportation

Session Overview: How has transportation policy changed over time in response to the 3 Es?

Readings:

Required:

1. Curtis, Colleen. "What You Need to Know about the Energy Security Trust." The White House Blog. March 15, 2013. <http://www.whitehouse.gov/blog/2013/03/15/what-you-need-know-about-energy-security-trust>
2. S.C. Rajan (2006): "Climate Change Dilemma: Technology, Social Change, or Both? An Examination of Long-Term Transport Policy Choices in the United States," *Energy Policy* 34: 664–679.
3. David Greene (1998) Why CAFÉ worked, *Energy Policy* 26/8, pp. 595-613 (PDF)
4. Philip Sharp (2006) Testimony on CAFÉ Program Reforms, House Committee on Energy and Commerce, May 3, 2006 (PDF)

Questions: 1) What challenges do clean transport policies face? 2) What can make these policies appealing to various stakeholder groups? 3) How do the 3 Es affect these policies?

Optional:

Ramjerdi, Faridah, and Karin Brundell-Freij. 2008. The dynamics of the market for alternative fuel vehicles: The Swedish case study presented at the MistraTransport.

Lovins, Amory. (1976) Energy Strategy: The Road Not Taken, October, *Foreign Affairs*, pp 65-96 (PDF)

V. WHERE energy policy is heading

Week 14: The roles of innovation and resilience

Session Overview: What roles do innovation and resilience in energy policy? How do they interact with the 3Es and 3 Ps?

ASSIGNMENT DUE: Analyze how the 3Ps and 3Es apply to the country's, state's, or city's energy system, and how they addressed/could address challenges to achieve change.

Readings:

Required:

1. John Holdren, 2006, The Energy Innovation Imperative, *Innovations*, spring, p. 3-23 (PDF)
2. Smil, Chapter 4.
3. Sagar, A. D., and J. P. Holdren. 2002. Assessing the global energy innovation system: some key issues. *Energy Policy* 30, no. 6 (May): 465-469.

4. Rees, William. 2010. The Post Carbon Reader Series: Foundation Concepts: Thinking “Resilience.” <http://www.postcarbon.org/Reader/PCReader-Rees-Foundation.pdf>

Questions: 1) What role can innovation play in meeting the 3Es? 2) How do the 3 Ps help or hinder innovation?

Week 15: Student presentations

ASSIGNMENT DUE: Turn in presentation slides.

Week 16: Student presentations

ASSIGNMENT DUE: Turn in final papers incorporating revision of all of the interim assignments, including revisions to the roadmaps based on what you’ve learned about challenges; and 2)
