

## **Energy Policy**

**EVPP 432/533**

**Spring 2021**

**Tuesdays/Thursdays 12:00 pm-1:15 pm ONLINE**

### **Instructor**

Dr. Jennifer Sklarew

Email: [jsklarew@gmu.edu](mailto:jsklarew@gmu.edu) (preferred method of contact)

Hours: Tuesdays, 1:30 pm to 2:30 pm by appointment

**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 Dr. 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) how energy systems form and change;
- 2) existing energy resources and policy options;
- 3) how energy policy is formulated;
- 4) challenges energy policymakers face;
- 5) how the parameters for 1-4 vary for different countries, and even different states or cities; and
- 6) what these 5 issues mean for local, national, and international energy cooperation and conflict.

### **Weekly Learning Objectives:**

Weekly learning objectives will help us to move toward our course learning objectives.

## **Readings:**

### Required text:

Bradford, Travis. 2018. *The Energy System: Technology, Economics, Markets, and Policy*. MIT Press.

### Suggested Sites for Energy Supply and Demand Data

- World Bank: [data.worldbank.org](http://data.worldbank.org)
- International Energy Agency (IEA): [www.iea.org/statistics/](http://www.iea.org/statistics/)
- U.S. Energy Information Administration (EIA): [www.eia.gov](http://www.eia.gov)
- U.S. Environmental Protection Agency (EPA): <https://www.epa.gov/energy/power-profiler#/>

### Optional:

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

Weekly readings: All students must read all of the required readings. Graduate students must also read the optional readings marked with \*\*. Reading questions for 432 and 533 appear in the syllabus and will be posted with the readings on Blackboard.

## **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. By midnight the Saturday before class, please send to me via email a) the article as a PDF and b) 2-3 questions for the class to discuss, so I can distribute them for everyone to read before class. Be prepared to lead a 15-minute discussion of the article and your discussion questions in class, starting with a brief summary of the article and how it relates to that week's topic. Graduate students also must create a short slide presentation summarizing their article and how it relates to their research interest, and must send their slide presentations to me by midnight the day before class. Late penalties for all submissions apply (see deadlines below).

2. **Semester project and interim assignments:** The overall assignment is to examine a) how a particular city, county, state, or country determines its energy portfolio (the balance of energy supply sources and demand-side measures); b) how the city, state, or country can attain the optimal energy portfolio, considering any challenges, and c) the role of the 3 E's and the 3 P's in determining how the area achieved its current energy profile, and how it can achieve the profile you think would be best. Graduate students also will add an individualized section that examines how their particular research interests affect or are affected by energy transitions. Examples include social entrepreneurship, food and/or water security, land use, and environmental ethics.

All semester project assignments should be submitted to me via email by the deadlines listed in the syllabus.

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 (hopefully) manageable pieces due about once a month.

- a. 3<sup>rd</sup> week: Choose a city, county, state or country for your project.
- b. 5<sup>th</sup> 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.
- c. 9<sup>th</sup> week: Roadmap to get to that portfolio, 3Es and other challenges facing it, stakeholder roles and priorities, and a list of references. Graduate students will include a section on how the roadmap and challenges affect your specific area of research (ecotourism, food/water security, etc.).
- d. 12<sup>th</sup> week: Analyze how the 3Ps and 3Es have addressed/could address challenges to achieve the changes you propose to the energy system, how they can mitigate stakeholder conflict, and how the 3Es and 3Ps combine to create challenges or synergies for the energy system transition for the place you selected. Graduate students also will analyze how your area of research interest will contribute to or be affected by the role of the 3Es and 3Ps on energy system change.
- e. 15<sup>th</sup> week: Turn in 1) final papers incorporating identifiable (track changes, highlighting, bold, underline, etc.) revisions of all interim assignments, including revisions to the roadmaps based on what you've learned about challenges; 2) presentation slides.

3. **Presentation:** At the end of the semester, each student must give a short presentation that explains his/her semester project results. Graduate students' presentations will include their additional research focus. More details will be provided later in the semester. Presentations will be scheduled during one to two class sessions and the final exam period.

4. **Extra credit presentation:** Sometime during the semester, you may give a short guest lecture on a topic relevant to energy policy, but not already covered in class or in your semester project (up to five extra credit points).

**Deadlines:** In fairness to all students, I will lower your grade by ten points for each day that any assignment is late without a previously approved extension, starting from the deadline. E.g., if you hand in your assignment within 24 hours after the deadline, 10 points off; within 2 days, 20 points off, etc. Extensions will be granted only for written requests that involve an emergency or other reason deemed valid by the instructor.

**Class participation/Group discussion:** Aside from the textbook readings, I will post readings, including the article of the week chosen by you, on Blackboard, along with questions for you to consider while reading. We'll discuss these questions in class. Optional readings marked with \*\* are required for graduate students, who will incorporate them into the class discussions. Your participation grade is based on your attendance in class and your active participation, which enables me to assess your understanding of the readings and concepts.

**Attendance:**

- Missing class: 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 reading questions and email your responses to me within two days after the missed class or by a deadline approved by me.** 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.
- Late arrival: If you are more than 15 minutes late to class without a valid explanation, your participation grade for that day will be reduced by 10 points.
- Non-attendance with login: If you join the class session but do not participate orally or via the comment box, I will contact you to ask whether you were attending class for the entire session.

**Basic Course Technology Requirements:**

Activities and assignments in this course will regularly use web-conferencing software (Blackboard Collaborate / Zoom).

Students should have **1)** regular, reliable access to a computer with an updated operating system (recommended: Windows 10 or Mac OSX 10.13 or higher); **2)** a stable broadband Internet connection (cable modem, DSL, satellite broadband, etc., with a consistent 1.5 Mbps [megabits per second] download speed or higher. You can check your speed settings using the speed test on this website.); **3)** a device with a functional microphone. In an emergency, students can connect through a telephone call, but video connection is the expected norm. Please let me know if you need any assistance in meeting these requirements.

**Course Materials and Student Privacy:**

- All course materials posted to Blackboard or other course site are private and must not be shared with anyone not enrolled in this course.
- By federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this course.
- Videorecordings of class meetings that include audio or visual information from other students are private and must not be shared.
- Live Video Conference Meetings (e.g. Collaborate or Zoom) that include audio or visual information from other students must be viewed privately and not shared with others in your household.
- Videorecordings of class meetings that are shared only with the instructors and students officially enrolled in a class do not violate FERPA or any other privacy expectation.

**Basis of Grading: EVPP 432**

Class participation	10%
Article Discussion Leadership	5%
Interim paper 1: 3-5 pages	15%
Interim paper 2: 3-5 pages	15%
Interim paper 3: 6-8 pages	15%
Semester Paper: 12-15 pages	20%
Final Presentation: 15 minutes	20%

**Basis of Grading: EVPP 533**

Class participation	10%
Article Discussion Leadership and Slide Presentation	5%
Interim paper 1: 5-7 pages	15%
Interim paper 2: 5-7 pages	15%
Interim paper 3: 8-10 pages	15%
Semester Paper: 18-25 pages	20%
Final Presentation: 20 minutes	20%

**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.)

<b>Grade</b>	<b>Percent</b>
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%
F	<70%

## **Diversity, Inclusion and Respect**

- This course aims to create a learning environment that fosters respect for people across identities. We welcome and value individuals and their differences, including gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, age and ability. I encourage all members of the learning environment to engage with the material personally, but to also be respectful when hearing experiences or views different than their own.
- If you wish, please share your name and gender pronouns with me and how best to address you in class and via email. I use she/her/hers for myself and you may address me as “Dr. Jen” or “Dr. Sklarew” in email and verbally.

## **Writing Assistance**

Mason’s Writing Center can provide tutoring and guidance on structure and grammar for course assignments, theses, and other projects. They provide in-person and on-line services. They are located in Robinson Hall, room 114A. Please see <http://writingcenter.gmu.edu/> or contact them at [wcenter@gmu.edu](mailto:wcenter@gmu.edu) or 703-993-1200.

## **General Support**

**Student Support and Advocacy Center (SSAC) and Resources for Crises:** OSSCM -- <https://ssac.gmu.edu> -- provides comprehensive (and confidential) services for your safety and well-being.

**Counseling and Psychological Services (CAPS):** provides a wide range of services to students by a staff of professional counseling and clinical psychologists, social workers, and counselors. CAPS individual and group counseling, workshops and outreach programs are designed to enhance students’ personal experience and academic performance. <http://caps.gmu.edu/>

**WAVES:** helps students develop and maintain healthy lifestyles through one on one support, interactive programs and resources. Topics include healthy relationships, stress management, nutrition, sexual assault, drug and alcohol use and sexual health. <http://waves.gmu.edu/>

**Gender-based/Sexual Discrimination:** The 1-page [George Mason University Title IX Resources](#) sheet may benefit those of you seeking resources to prevent, address &/or recover from gender-based discrimination – including sexual harassment, sexual assault, stalking, domestic violence, and sexual exploitation. It includes 16 on- and off-campus sources of assistance, including confidential ones.

**Safe Return to Campus Statement:** All students taking courses with a face-to-face component are required to take Safe Return to Campus Training prior to visiting campus. Training is available in Blackboard. Students are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage ([www2.gmu.edu/safe-return-plan](http://www2.gmu.edu/safe-return-plan)). All students in face to face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system, and students will receive a Green, Yellow, or Red email response. Only students who receive a "green" response are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get tested. Faculty are allowed to ask you to show your Green email and are thereby permitted to be in class.

### **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 Internet users 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. (<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: Tuesdays

Class lecture by instructor or guest speaker and discussion of lecture: Thursdays

Discussion of applications to projects: Tuesdays at the end of class

Lead-in to next class: 5 minutes

## **Session Topics and Readings:**

### **I. WHY energy policy matters: Priorities**

#### **Week 1 (January 26/28): Overview and syllabus review/Energy Systems & Energy Security**

Session overview: We'll discuss energy systems and elements of energy policymaking and policy.

Reading Questions and Readings:

432/533 Questions: 1) What energy system traits, complexities and challenges does the *IEA World Energy Outlook* reflect, especially with regard to infrastructure, linkages to other sectors, and risk? 2) How do energy security, environmental concerns and economics influence energy systems?

Required:

1. Bradford textbook, **p. 20 - top of p. 28:** Chapter 1. D. 2 b) “defining the energy system”; c) “subsystems within the energy system;” d) supply chains: a special type of system; and E. What constrains the energy system? 1. Scarcity; and Chapter 2, A.2. b) **p. 42-43:** History of Energy Flows.

\*for more information on primary energy supply vs. final consumption, see:

[https://energyeducation.ca/encyclopedia/Total final consumption](https://energyeducation.ca/encyclopedia/Total%20final%20consumption)

2. International Energy Agency. 2020. *IEA World Energy Outlook 2020*. Executive Summary.

3. U.S. Energy Information Administration. Electricity Explained: How electricity is delivered to consumers. <https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php>

4. Energy Innovation Policy & Technology LLC. 2020. Energy Justice: A Complex But Vital Piece To A Clean Energy Transition. <https://energyinnovation.org/2020/01/17/energy-justice-a-complex-but-vital-piece-to-a-clean-energy-transition/>

Optional

1. \*\*Grossman, P. 2015. Energy shocks, crises and the policy process: A review of theory and application. *Energy Policy*, Volume 77: 56-69.



2. Trabish, Herman. 2017. Why utilities say grid security is the most pressing sector issue of 2017. Utility Dive. April 10. <https://www.utilitydive.com/news/why-utilities-say-grid-security-is-the-most-pressing-sector-issue-of-2017/440056/>

### Lecture topics:

a. What is an energy system?

b. Policy vs. Policymaking

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

c. Energy Security Considerations

### **Week 2 (February 2/4): Environmental Considerations**

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

### Reading Questions and Readings:

432 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 executive order on environmental justice?

533 Questions: 1) How can energy policies address stakeholder groups' divergent environmental priorities? 2) What types of shifts in energy systems can balance environmental concerns with the other two Es, and why is entrenchment or lock-in a concern? 3) How is environmental justice addressed in energy policy at different scales, and is it addressed effectively?

### Required

1. Bradford textbook, Chapter 20: Ecosystem Interactions: p. 1041-1081: through B. Climate Change Risks and Interventions, 2. Climate change solutions, c. altering the capital flows.
2. Pacala, S. and R. Socolow. 2004. Stabilization wedges: Solving the Climate Problem for the next 50 years with current technologies. *Science* 305: 968-972. (PDF)
3. Presidential Proclamation -- 20th Anniversary of Executive Order 12898 on Environmental Justice. (PDF)
4. U.S. Energy Information Administration. Electricity Explained: Electricity and the Environment. [https://www.eia.gov/Energyexplained/index.cfm?page=electricity\\_environment](https://www.eia.gov/Energyexplained/index.cfm?page=electricity_environment)

5. United Nations Framework Convention on Climate Change. 2015. Adoption of the Paris Agreement, Draft Decision/CP-21. December 12.
6. Mooney, Chris. 2016. Why Big Solar and environmentalists are clashing over the California desert. *The Washington Post*. August 15.
7. Mooney, Chris. 2016. The Government Just Decided the Future of California's Desert, and Solar Companies Aren't Happy. *The Washington Post*. September 14.
8. 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: 202-228.  
[http://www.nap.edu/openbook.php?record\\_id=12619&page=195#p2001a9a59970195001](http://www.nap.edu/openbook.php?record_id=12619&page=195#p2001a9a59970195001)
9. American Public Health Association. 2018. *The Public Health Impact of Energy Policy in the United States*. November 13. (7 pages) <https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2019/01/28/public-health-impact-of-energy-policy>

### Optional

1. \*\* Berkhout, Frans. 2002. Technological regimes, path dependency and the environment. *Global Environmental Change* 12, no. 1 (4): 1-4.
2. 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/>
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](http://www.unep.org/training/programmes/Instructor%20Version/Part_2/Activities/Innovations_and_Technology/Energy/Supplemental/Energy_and_Air_Pollution_Challenge.pdf)

### **Week 3 (February 9/11): Economics**

Session overview: Why do 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.

**ASSIGNMENT DUE (Thursday before class)**: Via email or orally in class, please provide the city, county, state or country you plan to research for your semester project.

### Reading Questions and Readings:

432 Questions: 1) What types of incentives are carrots (positive/reward incentives), and which are sticks (negative/punitive incentives)? 2) Why choose carrots vs. sticks, and what are the

effectiveness, benefits and challenges of each? 3) How do different stakeholders prioritize economics?

533 Questions: 1) Why choose carrots (positive/reward incentives) vs. sticks (negative/punitive incentives), and what are the effectiveness, benefits and challenges of each? 2) How do different stakeholders' economics priorities create conflicts or synergies that energy policies can address? 3) How is India's environment for electricity restructuring different from that of the U.S.?

### Required

1. Bradford texbook, Chapter 5 (p. 197-219): Grid Economics.
2. Energy Information Administration. 2013. Feed-in tariff: A policy tool encouraging deployment of renewable electricity technologies. Today in Energy. May 30. <https://www.eia.gov/todayinenergy/detail.cfm?id=11471>
3. 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.)
4. Kaufman, Noah. 2016. Carbon Tax vs. Cap-and-Trade: What's a Better Policy to Cut Emissions? World Resources Institute. March 1. <http://www.wri.org/blog/2016/03/carbon-tax-vs-cap-and-trade-what's-better-policy-cut-emissions>
5. Net Metering: What Is It and Why Does It Matter? <http://www.govtech.com/fs/Net-Metering-What-Is-It-and-Why-Does-It-Matter.html>
6. 2019. The 2019 U.S. Energy and Employment Report: A Joint Project of NASEO and EFI. **Read p. ii-iv, Preface (xv-xvi), and Summary (2-7).**
7. Trabish, Herman K. 2019. 3 state commissions upending the way utilities do business. *Utility Dive*. October 2.
8. Government of the United States. Department of Energy. Property Assessed Clean Energy Programs. <https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs>
9. Power Purchase Agreements. GlobalRenewableHub. <https://globalrenewablehub.com/renewable-buyers-guide/ppas>
10. Renewable Energy Credits. EnergySage. <https://www.energysage.com/other-clean-options/renewable-energy-credits-recs/>

### Optional:

1. \*\* 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.

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

3. Pacific Northwest National Laboratory. 2002. Utilities, Deregulation and Restructuring of U.S. Electricity Markets.  
<http://www.purdue.edu/discoverypark/energy/assets/pdfs/History.pdf>

4. Borenstein, Severin and James Bushnell. 2000. 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 (February 16/18): Politics

Session overview: How do 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.

#### Reading Questions and Readings:

432 and 533 Questions: 1) How do politics influence prospects for energy transitions? 2) How do different stakeholders influence energy policy? 3) How can politics influence the roles of science and the 3Es in energy policymaking?

#### 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.

4. Daly, Matthew. 2016. EPA Fracking Report Offers Few Answers on Drinking Water. *U.S. News and World Report*. December 13.

5. Pyper, Julia. 2017. Large Corporations Are Driving America's Renewable Energy Boom. And They're Just Getting Started. *GreenTech Media*. January 10.
6. Marshall, Christa, and Sean Reilly. 2018. Scientists report political meddling, self-censorship. *E&E News*. August 14.
7. The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future. <https://joebiden.com/clean-energy/#>

Optional:

1. Laird, Frank N. 2013. Against Transitions? Uncovering Conflicts in Changing Energy Systems. *Science as Culture*, 22:2: 149-156.
2. Sklarew, Jennifer. 2018. "Power Fluctuations: How Japan's Nuclear Infrastructure Priorities Influence Electric Utilities' Clout." *Energy Research and Social Science*, Volume 41. July: 158-167.

**Week 5 (February 23/25): 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?

**ASSIGNMENT DUE (Thursday by midnight):** 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.

Reading Questions and Readings:

432 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?

533 Questions: 1) How does the U.S. energy policymaking process empower or disempower stakeholder groups' input of their priorities? 2) How do politics and the policymaking process interact to affect energy system transitions at different scales (e.g., local, state, regional, national)?

Required:

1. 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](http://bipartisanpolicy.org/sites/default/files/BPC_Governance_Report_0.pdf)
2. Kaufmann, John. 2010. CITIES, TOWNS, AND SUBURBS: Local Government in a Time of Peak Oil and Climate Change. *The Post Carbon Reader*.

3. Federal Energy Regulatory Commission. 2013. History of FERC.  
<http://www.ferc.gov/students/ferc/history.asp>
4. 15 State Attorneys General. 2016. Letter to President-Elect Trump regarding the Clean Power Plan. December 28. [http://www.eenews.net/assets/2017/01/03/document\\_gw\\_03.pdf](http://www.eenews.net/assets/2017/01/03/document_gw_03.pdf)
5. Bade, Gavin. 2018. Climate, project need at center of FERC pipeline policy review. Utility Dive. July 30.  
<https://www.utilitydive.com/news/climate-project-need-at-center-of-ferc-pipeline-policy-review/528908/>
6. Read the description of public comment process on Virginia’s Energy Plan update:  
<http://townhall.virginia.gov/L/comments.cfm?GeneralNoticeid=856>. If interested, choose a few comments to read. Also read the description of VA’s public comment process:  
<http://townhall.virginia.gov/UM/forums.cfm>
7. NYSERDA. 2020. New York State Announces Passage of Accelerated Renewable Energy Growth and Community Benefit Act as Part of 2020-2021 Enacted State Budget. April 3.  
<https://www.nyserda.ny.gov/About/Newsroom/2020-Announcements/2020-04-03-NEW-YORK-STATE-ANNOUNCES-PASSAGE-OF-ACCELERATED-RENEWABLE-ENERGY-GROWTH-AND-COMMUNITY-BENEFIT-ACT-AS-PART-OF-2020-2021-ENACTED-STATE-BUDGET>
8. Haelg, Leonore, Sebastian Sewerin, and Tobias S. Schmidt. 2020. The role of actors in the policy design process: introducing design coalitions to explain policy output. *Policy Sciences* (2020) 53:309–347. **Read the abstract, Actors in policy designing p. 313-315), Case selection (p. 315-316) and Table 1 (page 337).**

Optional:

1. Kemp, Rene. 1994. Technology and the Transition to Environmental Sustainability: The Problem of Technological Regime Shifts. *Futures* 26: 1023-1046.
2. 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.
3. Pyper, Julia. 2018. Trade Agency to Accept ‘Requests for Exclusion’ From New Solar Tariffs. *Greentech Media*. January 24.
4. 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 (March 2/4): Conservation and Efficiency**

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

Reading Questions and Readings:

432 Questions: 1) What challenges do conservation and efficiency policies face? 2) Why would stakeholders support or oppose conservation and efficiency policies? 3) Are the state and country rankings for energy efficiency surprising, and what factors might affect states' or nations' abilities to improve energy efficiency?

533 Questions: 1) What challenges do conservation and efficiency policies face? 2) Why would stakeholders support or oppose conservation and efficiency policies? 3) Are the state and country rankings for energy efficiency surprising, and what factors might affect states' or nations' abilities to improve energy efficiency? 4) How might the rebound effect influence energy efficiency policies?

Required:

1. Bradford textbook, p. 884-915, Chapter 17 (Thermal Demand and Supply) from “A. Energy Use in Industry, 4. Improving Industrial Thermal Energy” to “B. Energy Use in Buildings, 4. Improving Building Performance, d) Policies to Improve Building Performance.”
2. International Energy Agency. 2019. *Energy Efficiency 2019*.  
<https://www.iea.org/reports/energy-efficiency-2019>
3. Shahyd, K. and L. Ettenson. 2020. Federal Energy Efficiency: Promoting Equity and the Planet. Natural Resources Defense Council. July 9. <https://www.nrdc.org/experts/lara-ettenson/federal-energy-efficiency-promoting-equity-and-planet>
4. Innovation for Sustainable Development Network. 2019. Top Runner Program – energy efficiency improvements by making the best available on the market, the new normal. April 18.  
<https://www.inno4sd.net/top-runner-program-energy-efficiency-improvements-by-making-the-best-available-on-the-market-the-new-normal-546>
5. Brown, Hillary. 2010. CITIES, TOWNS, AND SUBURBS: Toward Zero-Carbon Buildings. *The Post Carbon Reader*.

6. Perry, Mitch. 2019. Florida doesn't need energy efficiency goals anymore, utilities claim. *Florida Phoenix*. August 20, <https://www.floridaphoenix.com/2019/08/20/florida-doesnt-need-energy-efficiency-goals-anymore-utilities-claim/>
7. ACEEE. 2019. The 2019 State Energy Efficiency Scorecard. **Read pages vi-xi.** (PDF)
8. ACEEE. 2018. The 2018 International Energy Efficiency Scorecard. Read pages iii-iv and 11. (PDF)

Optional:

1. \*\* Gillingham, Kenneth and Rapson, David and Wagner, Gernot, 2015. The Rebound Effect and Energy Efficiency Policy. FEEM Working Paper No. 107. **Skim for understanding of the main ideas and arguments.**
2. \*\* Gillingham, K., A. Keyes and K. Palmer. 2018. Advances in Evaluating Energy Efficiency Policies and Programs. *Annual Review of Resource Economics*. Vol. 10:511-532.
3. Natural Resources Defense Council. 2018. Trump Administration Energy Efficiency Delay Ruled Illegal. February 16. <https://www.nrdc.org/experts/nrdc/trump-administration-energy-efficiency-delay-ruled-illegal>
4. 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.
5. Eusterfeldhaus, Marcel and Barry Barton. 2011. Energy Efficiency: A Comparative Analysis of the New Zealand Legal Framework. *Journal of Energy & Natural Resources Law* 29(4):431-470. [https://www.researchgate.net/publication/279167137\\_Energy\\_Efficiency\\_A\\_Comparative\\_Analysis\\_of\\_the\\_New\\_Zealand\\_Legal\\_Framework](https://www.researchgate.net/publication/279167137_Energy_Efficiency_A_Comparative_Analysis_of_the_New_Zealand_Legal_Framework)
6. McKinsey & Company. 2009. [Executive Summary](#). *Unlocking Energy Efficiency in the U.S. Economy*. P. 1-14.



## IV. WHAT energy sources are currently available: Supply

### **Week 7 (March 9/11): 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?

Reading Questions and Readings:

432 Questions: 1) Which of the 3E's are national and local government and stakeholders prioritizing, and how do the 3P's impact oil and gas policies? 2) Do oil and gas policies cause conflicts among the 3 E's?

533 Questions: 1) How are the 3Es of oil and gas exploration, production, transport and end use represented in politics and process? 2) How do oil and gas policies cause conflicts or synergies among the 3 E's?

Required:

1. Bradford textbook, p. 268-284. Chapter 6 (Coal, Oil and Gas for Electricity), D. (Natural gas in electricity) through Appendix 6 (Supply Risk and Hedging Strategies)

2. Simon, Darran, and Elliott McLaughlin. 2017. Keystone and Dakota Access pipelines: How did we get here? *CNN*. January 25.

<http://www.cnn.com/2017/01/24/us/dapl-keystone-pipeline-environment-protesters-trump-order/>

3. Energy Information Administration. 2018. Natural Gas Explained: Where Our Natural Gas Comes From. December 3.

[https://www.eia.gov/energyexplained/index.php?page=natural\\_gas\\_where](https://www.eia.gov/energyexplained/index.php?page=natural_gas_where)

4. 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](http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html?pagewanted=all&_r=0)

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

6. Penn, Ivan. 2020. Atlantic Coast Pipeline Canceled as Delays and Costs Mount. *The New York Times*. July 5.

<https://www.nytimes.com/2020/07/05/business/atlantic-coast-pipeline-cancel-dominion-energy-berkshire-hathaway.html>

7. Nunez, Christina. 2020. Can Natural Gas Be a Bridge to Clean Energy? *National Geographic*.

<https://www.nationalgeographic.com/environment/energy/great-energy-challenge/big-energy-question/can-natural-gas-be-a-bridge-to-clean-energy/#close>

### Optional:

1. \*\* Government of the United States. Federal Energy Regulatory Commission. 2017. Commissioner Cheryl A. LaFleur Statement: Order Issuing Certificates and Granting Abandonment Authority. October 13.

<https://www.ferc.gov/media/statements-speeches/lafleur/2017/10-13-17-lafleur.asp#.W3xeqy-ZPOT>

2. \*\* Krupnik, Alan. June 2013. Managing the Risks of Shale Gas: Key Findings and Further Research. Resources for the Future. <http://www.rff.org/RFF/Documents/RFF-Rpt-ManagingRisksofShaleGas-KeyFindings.pdf>

3. \*\* Parfomak, P. W., Pirog, R., Luther, L., & Vann, A. 2013. *Keystone XL pipeline project: Key issues*. Washington, DC: Congressional Research Service.

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

5. 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 (March 16/18): 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?

### Reading Questions and Readings:

432 Questions: 1) Which of the 3E's are national and local government and stakeholders

prioritizing, and how do the 3P's impact coal policies? 2) What challenges do coal technologies face?

533 Questions: 1) What 3Es/Ps conflicts emerge from coal policies across different groups at local, national and international scales? 2) How have the challenges and solutions to coal use changed over time?

Required:

1. Bradford textbook, p. 234-268. Chapter 6 (Coal, Oil and Gas for Electricity): From A. Obtaining Coal through C. Coal System Constraints.
2. Old King Coal. *The Economist*, February 25, 2012.
3. Coal in the Rich World-the Mixed Fortunes of a Fuel. 2013. *The Economist*, January 5.
4. Green Car Congress. 2020. DOE announces \$11.5M in Phase 1 funding for carbon capture and storage program; ARPA-E FLECCS.  
<https://www.greencarcongress.com/2020/07/20200715-arpae.html>
5. Biello, David. 2014. Can Carbon Capture Technology Be Part of the Climate Solution? *Environment360*. September 8.  
<http://e360.yale.edu/feature/can-carbon-capture-technology-be-part-of-the-climate-solution/2800/>
6. U.S. Department of Energy. Coal. <http://energy.gov/coal>
7. U.S. Department of Energy. Office of Clean Coal and Carbon Management.  
<https://www.energy.gov/fe/science-innovation/office-clean-coal-and-carbon-management>
8. International Energy Agency. 2016. 20 Years of Carbon Capture and Storage: Accelerating Future Deployment. **Read Executive Summary on pages 9-13.**  
[https://www.iea.org/publications/freepublications/publication/20YearsofCarbonCaptureandStorage\\_WEB.pdf](https://www.iea.org/publications/freepublications/publication/20YearsofCarbonCaptureandStorage_WEB.pdf)

Optional:

1. \*\*International Energy Agency. 2013. *IEA Technology Roadmap for CCS*. Read pages 5-6.  
<https://www.iea.org/publications/freepublications/publication/TechnologyRoadmapCarbonCaptureandStorage.pdf>
2. \*\*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](http://www.ipcc.ch/pdf/special-reports/srccs/srccs_summaryforpolicymakers.pdf)

3. \*\*Mann, Charles C. 2014. Renewables Aren't Enough. Clean Coal Is the Future. *Science*. March 25. <http://www.wired.com/2014/03/clean-coal/>
4. U.S. Department of Energy. 2017. *Accelerating Breakthrough Innovation in Carbon Capture, Utilization and Storage. Report of the Mission Innovation Carbon Capture, Utilization, and Storage Experts' Workshop.*

### **Week 9 (March 23/25): Nuclear Power**

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

**ASSIGNMENT DUE (Thursday by midnight)**: Roadmap to get to your ideal portfolio, challenges facing it, and a list of references.

Reading Questions and Readings:

432 Questions: 1) Which of the 3E's are national and local government and stakeholders prioritizing, and how do the 3P's impact nuclear policies? 2) Do nuclear policies cause conflicts among the 3 E's? 3) What challenges do nuclear technologies face?

533 Questions: 1) How do the 3Es and 3Ps differ for nuclear power compared to other energy technologies? 2) How does the uranium mining study reflect the 3Es and 3Ps? 3) How have challenges and solutions to nuclear technology use changed over time?

Required:

1. Bradford textbook, p. 288 (Chapter 7 first page) and 312-336 (Chapter 7. C.).
2. Mycle Schneider, Antony Froggatt et al. 2019. *World Nuclear Industry Status Report 2019. Key Insights and Executive Summary.* P. 15-28.  
<https://www.worldnuclearreport.org/IMG/pdf/wnisr2019-v2-hr.pdf>
3. U.S. Department of Energy. Small Modular Reactors (SMRs).  
<http://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors>
4. U.S. Department of Energy. Benefits of Small Modular Reactors  
<http://www.energy.gov/ne/benefits-small-modular-reactors-smrs>
5. Gold, Russell and Cassandra Sweet. 2017. Nuclear Plants Fall Victim to Economic Pressures. *The Wall Street Journal*. January 9.  
<http://www.wsj.com/amp/articles/nuclear-plants-fall-victim-to-economic-pressures->

[1483957802](#)

6. World Nuclear Association. Nuclear Fusion Power. Updated December 20, 2016.  
<http://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-fusion-power.aspx>
7. Pyper, Julia. 2017. How the US Nuclear Debate Transcends Traditional Party Lines.  
*GreenTech Media*. August 27.  
<https://www.greentechmedia.com/articles/read/nuclear-us-debate-transcends-party-lines>

Optional:

1. \*\* 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](http://www.nap.edu/openbook.php?record_id=13266&page=1)
2. \*\* Cho, Adrian. 2019. Smaller, safer, cheaper: One company aims to reinvent the nuclear reactor and save a warming planet. ScienceMag.org. AAAS. February 21.  
<https://www.sciencemag.org/news/2019/02/smaller-safer-cheaper-one-company-aims-reinvent-nuclear-reactor-and-save-warming-planet>
3. Nuclear Accident Independent Investigation Commission. The Official Report of the Fukushima Nuclear Accident Independent Investigation Commission. 9-23.  
[http://www.nirs.org/fukushima/naic\\_report.pdf](http://www.nirs.org/fukushima/naic_report.pdf)

**Week 10 (March 30/April 1): Renewables I: Solar/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?

Reading Questions and Readings:

432 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) Do solar and wind policies cause conflicts among the 3Es? 3) What challenges do these technologies face?

533 Questions: 1) What 3Ps factors have influenced German and U.S. renewables policies? 2) What 3Es/Ps challenges does the New York legislation address? 3) How have renewables policies and challenges differed across the U.S., North Africa and China?

Required:

1. Bradford textbook, Chapter 8 A., B. and C. p. 350-391.
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](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1667615).
3. Interstate Renewable Energy Council. 2017. *Charging Ahead: An Energy Storage Guide for State Policymakers*. Executive Summary. April 19.
4. Trabish, Herman. 2017. Prognosis negative: How California is dealing with below-zero power market prices. *Utility Dive*. May 11.  
<http://www.utilitydive.com/news/prognosis-negative-how-california-is-dealing-with-below-zero-power-market/442130/>
5. Union of Concerned Scientists. 2017. Barriers to Renewable Energy Technologies. December 20.  
<https://www.ucsusa.org/clean-energy/renewable-energy/barriers-to-renewable-energy#.W3x09C-ZPOQ>
6. Casey, Tina. 2020. Holy Floating Solar With Green Hydrogen Offshore Wind Farm, Batman. August 3.  
<https://cleantechnica.com/2020/08/03/holy-floating-solar-with-green-hydrogen-offshore-wind-farm-batman/>
7. Federal Energy Regulatory Commission, Government of the United States. 2020. *FERC Order No. 2222: A New Day for Distributed Energy Resources*. September 17.

Optional:

1. \*\* 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.
2. \*\*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.
3. \*\*Burdick, Guy. 2020. NYSEDA moves to launch program targeting brownfields and other less desirable sites for renewables. *Utility Dive*. June 9.  
<https://www.utilitydive.com/news/nyserda-moves-to-launch-program-targeting-brownfields-and-other-less-desira/579416/>

4. 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/](http://www.nrel.gov/analysis/re_futures/)
5. 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.
6. 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 11 (April 6/8): Renewables II: Hydro, Biomass, Geothermal, Tidal, CHP, Waste-to-Energy, Hydrogen, Biofuels, etc.**

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 in alternative energy technology use?

Reading Questions and Readings:

432 Questions: 1) Which of the 3E's are national and local government and stakeholders prioritizing, and how do the 3P's how do the 3P's impact hydro, biomass, geothermal, tidal and other renewables policies? 2) What challenges do these technologies face? 3) Do these policies cause conflicts among the 3 E's?

533 Questions: 1) How can renewables policies address the range of challenges and benefits presented by different technologies? 2) How have challenges to renewables technologies changed over time? 3) How do renewables advances and challenges differ across various nations?

Required:

1. Bradford textbook, p. 289-312 (hydropower, Chapter 7 A. and B.), p. 274 (CHP, Chapter 6 D. 2. b) and 574-575 (CHP, chapter 11 D. 1. a-b.), and p. 391-413 (biomass/biogas, geothermal, ocean energy, Chapter 8. D., E., F.).
2. International Energy Agency. 2020. Tracking Power: Hydropower. <https://www.iea.org/reports/tracking-power-2019/hydropower>
3. U.S. Environmental Protection Agency. RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land, Landfills and Mine Sites. <https://www.epa.gov/re-powering/learn-more-about-re-powering#what>

4. Johnson, Scott. 2019. THERE'S HEAT IN THEM THAR HILLS — US report finds sky is the limit for geothermal energy beneath us. *ars technica*. June 11. <https://arstechnica.com/science/2019/06/report-geothermal-could-power-up-to-16-of-us-grid-by-2050/>
5. Jones, Nicola. 2018. Waste Heat: Innovators Turn to an Overlooked Renewable Resource. May 29. <https://e360.yale.edu/features/waste-heat-innovators-turn-to-an-overlooked-renewable-resource>
6. Greentumble. 2018. Waste Incineration Advantages and Disadvantages. August 2. <https://greentumble.com/waste-incineration-advantages-and-disadvantages/>
7. Conca, James. 2017. Tidal Energy -- All Renewables Are Not Created Equal. *Forbes*. July 27. <https://www.forbes.com/sites/jamesconca/2017/07/27/tidal-energy-all-renewables-are-not-created-equal/#74998c2c4f4e>
8. Maize, Kennedy. Combined Heat and Power: 2019. A Sleeping Giant May Be Waking. *Power*. March <https://www.powermag.com/combined-heat-and-power-a-sleeping-giant-may-be-waking/>
9. International Renewable Energy Agency. 2019. Hydrogen: A Renewable Energy Perspective. Report prepared for the 2nd Hydrogen Energy Ministerial Meeting in Tokyo, Japan. **Read Overview of Findings, p. 5-6.**

Optional:

1. \*\* International Energy Agency. 2019. Overview: *Renewables 2019 Market Analysis and Forecast from 2019 to 2024*. October. <https://www.iea.org/reports/renewables-2019#> **2 readings: 1 with graphs, and 1 with more detail)**
2. 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. Read pages 1-3 and conclusions. Skim other pages of interest. [http://www1.eere.energy.gov/geothermal/pdfs/policy\\_overview.pdf](http://www1.eere.energy.gov/geothermal/pdfs/policy_overview.pdf)
3. Caputo, Jesse. 2009. *Sustainable Forest Biomass: Promoting Renewable Energy and Forest Stewardship*. Environmental and Energy Study Institute. [http://www.eesi.org/070609\\_sustainableforestbiomass](http://www.eesi.org/070609_sustainableforestbiomass)
4. U.S. Department of Energy. 2014. Energy Dept. Report Finds Major Potential to Grow Clean, Sustainable U.S. Hydropower. <http://energy.gov/articles/energy-dept-report-finds-major-potential-grow-clean-sustainable-us-hydropower>
5. ACEEE. Combined Heat and Power (CHP). <https://aceee.org/topics/combined-heat-and-power-chp>



## Week 12 (April 13/15): Transportation

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

**ASSIGNMENT DUE (Thursday by midnight):** 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.

Reading Questions and Readings:

432 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?

533 Questions: 1) Are the current solutions to clean transport challenges effectively addressing the challenges? 2) How do the challenges to clean transport differ across communities and nations? 3) What role do/should clean transport policies play in the broader context of the 3Es of energy systems?

Required:

1. Bradford textbook, p. 618-666 (Chapter 13, Transportation Services and Infrastructure) and 778-780 (Chapter 15 A.4. Advances in Biofuel Feedstocks and Technology).

2. Jenn, Alan, Katalin Springel, and Anand R. Gopal. 2018. Effectiveness of electric vehicle incentives in the United States. *Energy Policy* 1 (19): 349-356.

3. Government of the United States, Department of Transportation. 2018. Notice of Proposed Rulemaking: The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks. August 1. **Read p. 1-2 and skim pages 3-33 for main themes.**

4. Mock, Peter, and Zifei Yang. 2014. Driving Electrification: A Global Comparison of Fiscal Incentive Policy for Electric Vehicles. White Paper for the International Council on Clean Transportation. May. **Read the Executive Summary; the rest is optional.**

5. Gersdorf, Thomas, Russell Hensley, Patrick Hertzke, and Patrick Schaufuss. 2020. Electric mobility after the crisis: Why an auto slowdown won't hurt EV demand. September 16. McKinsey & Company. <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/electric-mobility-after-the-crisis-why-an-auto-slowdown-wont-hurt-ev-demand>

### Optional:

1. \*\* Rajan, S.C. 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.
2. Ramjerdi, Faridah, and Karin Brundell-Freij. 2008. The dynamics of the market for alternative fuel vehicles: The Swedish case study presented at the MistraTransport.
3. Lovins, Amory. 1976. Energy Strategy: The Road Not Taken, October, *Foreign Affairs*, pp 65-96.
4. Diamond, David. 2008. Impact of High Occupancy Vehicle (HOV) Lane Incentives for Hybrids in Virginia. *Journal of Public Transportation*, Vol. 11, No. 4: 39-58.
5. Greene, David. 1998. Why CAFÉ Worked. *Energy Policy* Vol 26, Issue 8: 595-613. (PDF)
6. Sharp, Philip. 2006. Testimony on CAFÉ Program Reforms, House Committee on Energy and Commerce, May 3, 2006. (PDF)

### **V. WHERE energy policy is heading**

#### **Week 13 (April 20/22): 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?

#### Reading Questions and Readings:

432 Questions: 1) What role can innovation play in meeting the 3Es? 2) How do the 3 Ps help or hinder innovation? 3) What roles do various stakeholders play in innovation, and what role should policies play in promoting it?

533 Questions: 1) How do innovation and resilience relate to one another in the context of energy systems? 2) How do the 3 Ps help or hinder innovation? 3) What role should governments, private sector and consumers play in innovation on energy technologies, and should this differ across nations?

#### Required:

1. John Holdren, 2006, The Energy Innovation Imperative, *Innovations*, spring, 3-23.

2. Rees, William. 2010. The Post Carbon Reader Series: Foundation Concepts: Thinking “Resilience.” <http://www.postcarbon.org/Reader/PCReader-Rees-Foundation.pdf>
3. Skea, Jim. 2014. The Renaissance of Energy Innovation. *Energy and Environmental Science*, Issue 1: 21-24.
4. Smith, Lamar. 2017. Opening Statement, Hearing on Energy Technology Innovation. Committee on Science, Space and Technology, U.S. House of Representatives. July 19.
5. World Economic Forum. 2018. White Paper: Accelerating Sustainable Energy Innovation. [http://www3.weforum.org/docs/Accelerating\\_sustainable\\_energy\\_innovation\\_2018.pdf](http://www3.weforum.org/docs/Accelerating_sustainable_energy_innovation_2018.pdf)

### Optional

Osofsky, Hari M. 2014. Envisioning Legal and Policy Pathways for Energy Innovation Symposium: Introduction. *Minnesota Journal of Law, Science and Technology*. Vol. 15, No. 1: 287-291.

### **Week 14 (April 27/29): Student presentations**

#### **ASSIGNMENT DUE:**

**Friday, April 30, by 8 am:** Via email, turn in one final paper that merges all of the interim assignments. Final papers should 1) incorporate revision of both interim assignments to address all of the instructor’s comments/feedback and any new material you wish to include; 2) indicate all changes and revisions of interim assignment text using track changes, highlighting, bold, underlining, etc.

### **Week 15 (May 6, 10:30 am - 1:15 pm): Student presentations**

#### **ASSIGNMENT DUE:**

**Wednesday, May 5, by midnight:** Turn in presentation slides via email.