PA 567

Energy Resources: Policy & Administration

Fall 2023 Last Modified 1 Dec

CLICK TO SEE SCHEDULE

Official Course Description

Reviews the history, politics, and institutions related to current energy policy and administration with particular attention to the Pacific Northwest and development of hydroelectric power. National energy policy history is reviewed including political, financial, and environmental problems. Explores the roles of interest groups; state, local, national, and international governments; and regional governing institutions. It explores the changing distribution of social costs and benefits as both a cause and result of policy change. Passage of the 1980 Northwest Power Act, the Northwest Power Planning Council created in the act, and the implementation of the act will be studied, as will current issues like energy conservation, regional power planning, deregulation and the status of institutions involved in energy policy, and Columbia basin fish and wildlife conservation.

Figure 1: Source www.Hopeforthehills.org

Background

Energy drove the industrial revolution and is driving the post-industrial revolution as well. Call centers, mobile phones, and quantum computers all share the need for reliable energy supplies. When combined, the transportation, building, and industrial energy industries create, by far, the largest economic sector in the world. Because of its socio-economic importance, as well as its substantial environmental footprint, the energy industry is heavily regulated.

Against this backdrop, the electricity sector is undergoing especially turbulent times as traditional business models are being altered due to renewable energy targets, climate change legislation, as well as energy efficiency and distributed generation requirements. Utilities are being required to deliver renewable electricity to their customers, but transporting the renewable electricity from rural to urban areas is increasingly difficult due to citizen and environmental opposition to new power lines. The Northwest

electricity sector includes federal hydropower suppliers with large impacts on regional market development. With rapid decarbonization policies being promulgated that typically entail fuel switching from natural gas to renewable electricity technologies, natural gas suppliers' historical business models are also under flex.

PA 567 provides social science theories and analytical tools to help graduate students and energy sector professional navigate the complexities of the energy sector. The course is broken down into two primary modules. Module one prepares students to perform analyses of energy sector projects as well as the regulatory system overlaying the energy sector. The learning objective for module one also includes energy analysis in MS Excel to make students competitive for energy sector employment and academic research. Module two applies the skills learned in the first module to a range of energy policy topics relevant to the Western US. The policy and history of energy policy in the Western US is included throughout the course.

This course is recommended as a pre-requisite for PA 573 Smart Grid and Sustainable Communities.

Course Information

Time:	**Tuesdays 6:40-9:20**
Room:	URBN 303 & Online via Zoom
CRN:	**12528**

Instructor

Hal T. Nelson, Ph.D., CFA
Associate Professor
Email: HNelson@pdx.edu
Phone: 503.725.3251 (office)
503.236.6720 (mobile)

Hybrid Course Zoom Meeting Information

Join Zoom Meeting
https://pdx.zoom.us/j/84197037442

Meeting ID: 841 9703 7442

iPhone one tap mobile
+19712471195,,84197037442# US (Portland)
+1 971 247 1195 US (Portland)

Technology Specialist/Professional Development Coordinator
Nicole Savara-Brown nsavara@pdx.edu

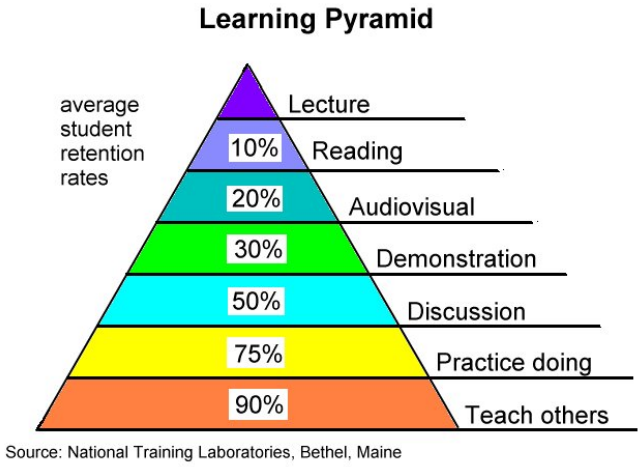
Office Location: URBN 670-L
Virtual & In Person Office Hours: Tuesdays 1:30-3:30 & by appointment (preferred)

You can join via Zoom and wait in the virtual waiting room until I am done with the previous student. **Please send me a meeting invite or email to reserve your office hours spot!** You can book a spot with me: https://calendly.com/hal-psu/psu-meeting

The best way to get in touch with me is via email. I will endeavor to respond to email/voice messages within 1+/-1 business day. **Please include PA 567 in the subject line. Please do NOT use the Canvas email.**
FYI: In my elusive quest for work-life balance, I try not to check email on the weekends.

Course Prerequisites
Graduate-level policy process, policy analysis, microeconomics, and statistics courses are suggested.

The Learning Pyramid as a (rough) Heuristic: Average retention rates for material taught using various methods (estimated percentages and ordering of teaching strategies may vary for individuals and the subject matter).[1]



Because lectures are the worst means of learning material, I use a mixed bag of pedagogical techniques in the class in order to increase learning rates in a seminar style. Learning by "practice doing" in the form of homework is one pedagogical strategy. Social science theories are incorporated into current energy policy problems to help integrate theory and practice. We also flip the classroom and students are given an opportunity to present their research as well as one of the course readings over the term.

Course Competencies

PSU's Department of Public Administration has developed a list of "key competencies" that students are expected to develop through their various course and experiences at PSU. The following key competencies are supported by this course.

1. Conceptualize, analyze, and develop creative and collaborative solutions to challenge in public policy, leadership and management.

[1] http://www.washingtonpost.com/blogs/answer-sheet/wp/2013/03/06/why-the-learning-pyramid-is-wrong/

2. Assess challenges and explore solutions to advance cross-sectoral and inter-jurisdictional cooperation in public programs and services.
3. Demonstrate verbal and written communication skills as a professional and through interpersonal interactions in groups and in society.
4. Think critically and self-reflectively about emerging issues concerning public service management and policy.

By the end of this course:

1. Students will develop a knowledge of energy supply and demand basics.
2. Students will understand the socio-political context of energy policy in the Western US.
3. Students will understand how the institutional history of the NW power system impacts current policy proposals and outcomes.
4. Students will understand linkages between energy production and consumption and its environment impacts.
5. Students will be able to perform basic energy analysis using MS Excel
6. Students will understand the changes to the electricity sector from climate change legislation, distributed renewable energy, as well as conservation policies.
7. Students will be able to write a clear and concise policy paper.
8. Students will be able to present research results effectively in a professional setting.

Evaluation: For-Credit Students

1. Each student is required to be the discussion leader (student chat) for one of the scholarly articles (preferred) or book chapters (less preferred) assigned over the term (14%).
   News articles by themselves are not adequate for discussion leaders, but you are encouraged to link the readings to the news articles.
   a. Students ~~can choose from any of the assigned readings over the term but~~ are encouraged to use the reading from the current week.
      i. Again, scholarly articles and white papers are the preferred subject for discussion leaders. News articles need to be linked to the other readings.
      The google sheet sign up for discussion leaders is here:
      Make sure that your weekly topic is what you think it is in case the schedule has changed.
   b. Presentation should be a 10-minute (MAX) presentation using PowerPoint or handouts followed by Q&A.
   c. You MUST use the Discussion Leader Guidance PPT on Canvas >Modules> Assignments to structure your presentation.
   d. Post your PPT to Canvas prior to class: Discussions>PPTs file repository and discussion.

e. Instead of presenting only on one of the readings, I also offer (encourage) you to offer an integration and evaluation of the speaker's material with the readings for that week (or the appropriate week). This is more of a real-time analysis, with less preparation but similarly requires you to "know" the module's reading assignments.
f. If you choose a book chapter, you should need to compare and contrast the chapter with the news article for the week. Other relevant class materials may be brought into the presentation as well.

2. Online Course participation consists of three elements weighted equally (21%). All are due at 6:40 PM each week; one based on the current week's readings, and two based on the previous weeks speaker's comments and student feedback.
    a. **Before Class Preparation (BCP):** This assignment is based on the upcoming week's readings and due on Canvas>Assignments at 6:40 pm on Tuesday night prior to each week's course session.
        i. AFTER completing the week's readings, carefully craft one question **for the speaker** that you develop on your experience and the reading material. The question can be a clarification of the material, an extension of the speaker's material, a linkage between the speaker's material and other course reading. It can also identify logical inconsistencies in the material, question the "conventional wisdom" or ask questions about evaluative criteria that the speaker did not cover (ie equity, externalities, effectiveness, efficiency, or empowerment). These questions will be shared on the discussion board as possible for the speaker Q&A.
    b. **After Class Discussion:** This assignment is based on the **previous week's speaker's comments** (and the associated readings for the previous week) and is for your fellow students and the co-instructors. It is due on Canvas>Assignments or Canvas>Discussions>Week# at 6:40 pm on Tuesday night after each week's course session.
        i. The discussion question can be a follow on question from your BCP, something that sparked your interest from the class discussion, or it can be linking the previous week's readings to the upcoming week's readings. Please read the following blog on how to write engaging discussion questions: https://www.eduflow.com/blog/how-to-write-discussion-questions-that-actually-spark-discussions
    c. To better integrate student discussion questions you need to read all the student After Class Discussion posts each week and reply to one. Replying to a thread each week is part of the participation element of the class.
3. You are required to compose a group research paper that integrates the course learning objectives into an arena of your choosing (20%).
    a. There will be a paper proposal due in February that will outline the research design and methods assignment.
        i. Each member of the group will be graded on the quality of their own unique contribution to the paper. Each group member's effort on the paper will be graded by their peers.

ii. You are expected to be able to write at the graduate level, including concise summaries of policy concepts and results. I may refer you to the writing center: http://www.pdx.edu/writing-center/
iii. Put your ideas for possible paper topics into the Energy Policy & Mgt Tab in the News Report google sheet here:
iv. More information on the research paper and proposal will be given out at a later date.

4. PPT and Presentation of the research paper: Students are expected to give a short presentation of their research topic the last week of class. This "mini-conference presentation" is a key learning outcome. (15%)
5. Homework assignment (15 %)
    a. The homework is an energy analysis assignment and will cover material from the text, lectures, as well as the other readings. There is a video lecture on the HW here: https://media.pdx.edu/media/PA+567+NPV+Lecture+and+HW1/0_x6gccw8p
6. Finally, in-class participation is critical to the course learning environment (15%). Student evaluation of their participation is based on Instructor evaluation. Participation will be evaluated over the entire term.
    a. As part of your participation grade, you also need to upload your current professional bio here: https://docs.google.com/document/d/13PwFinW0vu8UmnralhLI6Xg2S_kMCS7AZxEI6ehcn48/edit?usp=sharing

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Evaluation: Professional Development Participants

- Professional development participants MUST complete the assignment to prepare a one paragraph bio on their history, interests, and future plans/desires.
    - Participants are strongly encouraged to join one of the research paper groups and offer their sage counsel to their peers.
    - Participants are also encouraged to bring in relevant news articles / reports to share with the class.
    - The Google Doc to add your bio to is here: https://docs.google.com/document/d/13PwFinW0vu8UmnralhLI6Xg2S_kMCS7AZxEI6ehcn48/edit?usp=sharing
- NOTE: If you take the class through the professional development option, you will not be able to retroactively have it count towards the Graduate Certificate in Energy Policy and Management. If you think you may want to pursue the certificate, I suggest that you enroll for the class as for-credit.

Course Policies

Grading Scale
Your grade will be calculated using the following scale. Grades with plus or minus designations are at my discretion.

Letter Grade	Grade Point	Description	Learning Outcome
A	4.0	Complete mastery of course material and additional insight beyond course material	Insightful
B	3.0	Complete mastery of course material	Proficient
C	2.0	Gaps in mastery of course material; not at level expected by the program	Developing
U	0	Unsatisfactory	Ineffective

Grading Details

Letter Grade	Range	Letter Grade	Range
A	93-100	C+	77-79
A-	90-92	C	73-76
B+	87-89	C-	70-72
B	83-86	Let's talk	<70
B-	80-82		

- Grade Appeals: If you want to appeal a grade that you received on a work product, please submit a short written summary of your argument as well as relevant documentation. Grade change requests will not result in a lower grade being given.

- **Learning expectations**
  - Remote learning in grad school is not ideal. However, we do have an opportunity to create similar sense of trust and a common identity as students using this format as well as in-person.
  - Some requirements exist for this to happen though, at is requires exercising self-care and community care.
    - Be civil: All discussions will be professional and not personal. If you have concerns about the class dialogue, please see me immediately, don't let issues with your classmates (or professors) fester.
      - Statements made in class by students and guest lecturers are assumed to represent their personal opinion (unless otherwise stated) and not any organization that they may work for.
      - Do not post any material from this course on a public-facing website without my approval.
    - Emotional subject matter: This class contains analysis of topics that can bring forth emotional responses. Graduate school is not a twitter

feed that one can scrutinize for PC-ness.
        - We want to build a strong container for the class so that students feel comfortable sharing their experiences and perceptions. Please support each other and me in building and maintaining the container! I tend to fall back on evidence-based arguments so keep me on track to elevate lived-experiences too!
    - In order to develop community, PLEASE leave your video on when possible as we would in an in-person class.
- We will be using the interactive tools that are built-in to Zoom.
    - One set of tools is nonverbal feedback in the participants button at the bottom: click on that and there are icons for what you are feeling: Raise hand, away, need a break, go slower, faster, yes, no.
- We will be recording the Zoom sessions for later review and integration
- Because the sessions will be recorded, and I don't know what all gets recorded, be careful about what you write in the chat and say in the chat rooms. Do not communicate personal information that you don't want others to see!!

Zoom/Technical Issues

- Everybody should remember to breathe deeply at all times. *We are going to make this work the best we can and beyond that not worry about it.*
    - Please use my office hours to schedule a time to meet with me to let me know how the course is going for you
- Two student computer labs will remain open during spring term — with proper health practices in place — in the first floor of Millar Library and in the basement of Fariborz Maseeh Hall.
- OIT has laptops to check out for students who need them (maybe). See below for free software sources. https://library.pdx.edu/study-spaces-computers/equipment/

- Some (unfortunately) don'ts: Students are not to multi-task with extra-curricular activities during class.
    - Please do not surf the web or answer emails during class
    - Try to save your Zoom fatigue allotment for our class!
    - Turn off your video only for personal responsibilities or if you are emotionally exhausted.
- **Maintaining Confidentiality:** Class discussions benefit greatly when professional experiences and actual situations are incorporated to illustrate key issues. When discussing personal/professional experiences, students should avoid, insofar as possible, revealing the identities of colleagues or others whose confidentiality may be compromised in the course of the discussion. All students participating in class discussions should similarly maintain the confidence of their peers' experiences that are shared in the spirit of academic discourse.
- **How to be successful in this class**

1) Build on the readings with active studying, to integrate the material with your experiences and existing understandings. Then, you will be ready to ask questions (draft these prior to class to reduce stress about asking them).
2) Complete ALL the assignments.
3) Communicate with me about any barriers you are having in the class.

Required Course Readings

All graduate students are **required** to buy the following book:

- Randolph, J., & Masters, G. M. (2018). *Energy for sustainability: technology, planning, policy*. 2nd Ed. Island Press. ISBN 9781610918206 1st edition is OK too, but you need to make sure the chapters #'s match up with the syllabus.

Professional development students without an energy background will also find the book useful.

- This book is in the PSU bookstore. If you buy it online, be sure to get expedited shipping as we will be using it immediately.
- I have an extra copy to loan out to one person over the term. First-come, first-served.

Handouts from other book chapters will be given for the reading assignments. Additional readings are in the Files folder.

In addition to the course text, **other required** journal articles and book chapters will be posted on Canvas.

- If something is missing please email me immediately.
- Optimal readings are always coming across my desk. The syllabus may contain TBA (to be announced) when I have yet to find an optimal reading to exhibit the learning goals of the week. Thus, the syllabus should be considered a living document that will change over the course of the term. *The most current version can always be found on Canvas and you should consult it before doing the readings each week*.

Recommended Readings

I reserve the right to distribute additional readings as the term progresses. I will usually bring some elements of the recommended readings into the class discussions, so some familiarity with them (i.e. quick scan) on your part will be beneficial to your learning environment.

Great information can be found on energy policy and management in the NW through the local industry newspaper, *Clearing Up. Clearing Up* is available to anyone with a PDX.EDU email.

- You need to sign up in the Clearing Up tab Google Sheet with your name and PSU email here:

List of Acronyms (LoA-- Sorry I couldn't resist)

Note that there is a list of common acronyms used in the energy world here: https://docs.google.com/document/d/1hIMPrWGk152RHgGwDglQzseVwu9tj44BWHwFeo4ZxIo/edit?usp=sharing

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Important Dates for Graduate Students

- Important dates for dropping or changing grading options can be found here
  - Last day to change to Pass/Fail grade option: 12 Nov
- Homework: Homework will be due electronically on Canvas at 6:40 on the day of class
  - HW #1 due: **31 Oct** at 6:40.
- Final paper due: **9 Dec at** 6:40 **pm**
  - Paper Proposal Due: **10 Nov** at 6:40 (Canvas
  - Student research presentation PPT due: **3 Dec** at 6:40 pm (email)
  - Student research presentations: **5 Dec** at 6:40 pm in-class
- All work products for the class due no later than **9 Dec at** 6:40 pm (email)

Schedule (Click on the hyperlink to see each module's readings) Subject to change based on speaker availability

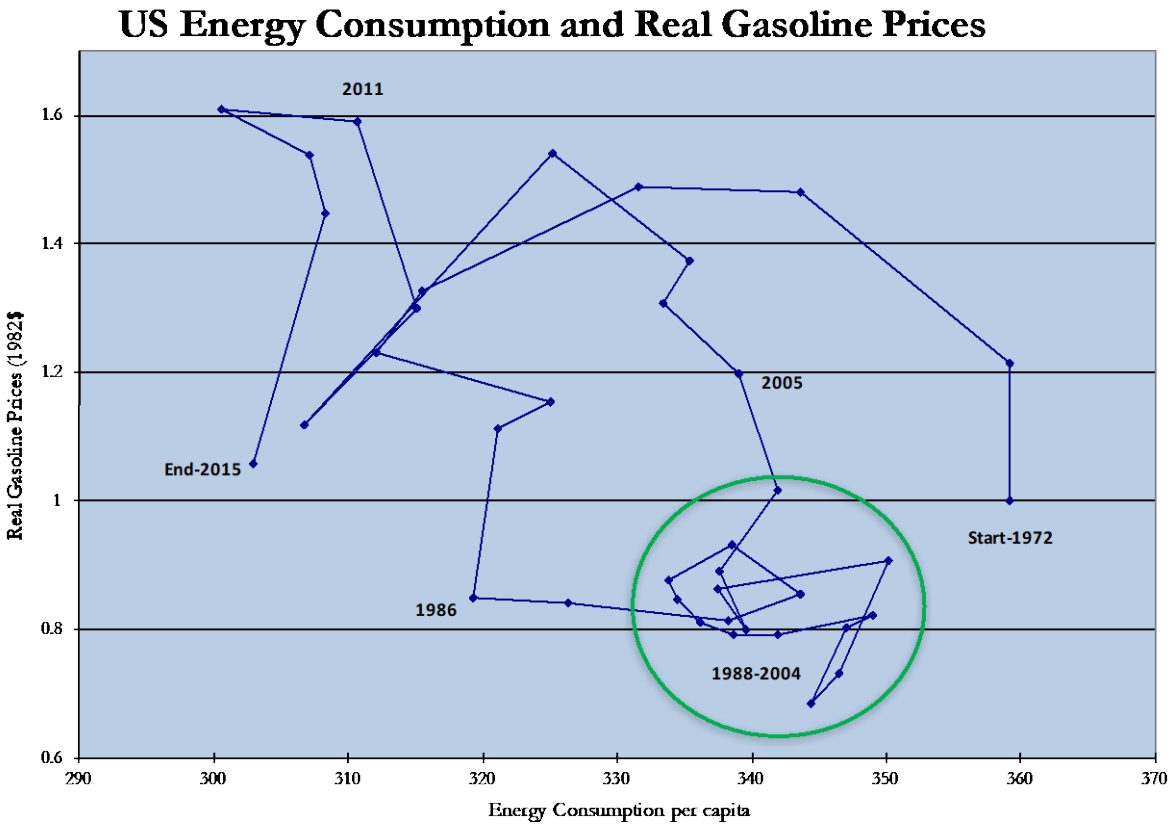
Week	Date	Placeholder Topic	Speaker	Deliverable
1	**26 Sept**	**Introduction of class members and syllabus**	Nelson PSU	
2	**3 Oct**	**The Electricity and Natural Gas Sectors- Overview**	Nelson PSU	
3	**10 Oct**	**The History of & Institutional Context for NW Energy Policy**	Jeff Hammarlund PSU	
4	**17 Oct**	**Integrated Resource & Distribution Planning**	Angela Long Rockcress Consulting	
5	**24 Oct**	**Energy Efficiency and Demand Response**	Danielle Walker US Dept of Energy	
6	**31 Oct**	**Siting New Renewables (& Power Lines)**	**NOTE DATE CHANGE** Nelson PSU	HW #1 Due

7	**7 Nov**	**Energy Economics and Modeling and Adequacy**	Rebecca Sexton Western Power Pool (7:45)	10 Nov Paper Proposal Due
8	**14 Nov**	**Carbon and Renewables Policies (Zoom Only)**	Pam Marsh Oregon House (D5) Meredith Connolly Climate Solutions Nora Apter OR Envtl Council	
9	**21 Nov**	**Electric Vehicles and Energy Justice**	Sylvie Ashford TURN	
10	**28 Nov**	**Grid Modernization and Rates**	Pam Sporborg PGE	Draft PPT due 3 Dec at 6:40
11	**5 Dec**	**Where the Rubber Meets the Road** & Student Paper Presentations	Dan James-BPA (confirmed @ 6:40), PSU Students	Presentations (Paper due: Sunday 9 Dec at 6:40pm)

Course Reading Assignments:

Week 1: Introduction of class members and syllabus **(Back to Top)**
Course Overview
The Importance of Energy
For the first time since president Nixon declared energy "independence" as a policy priority, the gap between US energy production and energy consumption has begun to narrow, due in large part to shale oil and gas production in the U.S.—but also to improving energy efficiency and policy-driven incentives.

Others have described this as a commodity "super-cycle", but this doesn't do justice to the underlying supply and demand dynamics. See the "Cobweb graph" with inflation adjusted gas prices on the Y-axis and per capita energy consumption on the X axis. Start on the right side of the chart in 1972 and work to the left to follow the two big cobweb patterns since 1972.



The Importance of Hydropower in the Northwest

The antithesis of the fossil fuel super-cycle is cheap hydropower. The Northwest enjoys abundant hydro resources, that have (somewhat) stable production costs, but these resources are integrated into a power market that includes the entire Western US, including California. Climate change and increasing amounts of wind and solar electricity are also changing the value of hydropower.

Reference

- Arango, S., & Moxnes, E. (2012). Commodity cycles, a function of market complexity? Extending the cobweb experiment. *Journal of Economic Behavior & Organization*, 84(1), 321-334

DISCUSSION QUESTIONS:

1. What do you think causes the relationship between energy and price in the above graph?
2. What effects might this pattern have on investment and consumption decisions, and how might these dynamics it be mitigated (if at all)?

The Electricity and Natural Gas Sectors-Overview (Nelson) [(Back to Top)]

Introductory Corner:

- Randolph, J., & Masters, G. M. (2018). *Energy for sustainability: technology, planning, policy*. Island Press. Chapter 9.
- PGE. (2021). Understanding My Bill: Guide to charges and other important information. https://portlandgeneral.com/help/help-topics/understanding-my-bill
- PJM. (2023). Capacity Market (RPM). https://learn.pjm.com/three-priorities/buying-and-selling-energy/capacity-markets.aspx
- Peters, B. Guy (2019). *American public policy: Promise and performance, 11th Edition*. Los Angeles, CA: Sage. (10th edition is OK too) Ch 3: Explaining Policy Choices. On Canvas.

Required Reading

- Blanke, E. (2023). En Banc: Current Gas Market Conditions and Impacts of Gas Prices on Electricity. CA ISO presentation in CPUC En Banc Proceeding. 7 February. On Canvas.
- Blade,G. **(**2017). The great capacity market debate: Which model can best handle the energy transition?. *Utility Dive*. 18 April.
- Busby, J. W., Baker, K., Bazilian, M. D., Gilbert, A. Q., Grubert, E., Rai, V., ... & Webber, M. E. (2021). Cascading risks: Understanding the 2021 winter blackout in Texas. *Energy Research & Social Science*, 77, 102106. On Canvas.

News Article

- Uberti. (2023). Why Gas Bills Are Going Crazy—With No End in Sight; Supply challenges contributed to the most volatile year on record for natural gas. *WSJ.* 15 March. On Canvas.

Recommended

- Maize, K. (2022). Market Transitions: The MOPR Merry-Go-Round. *Power Magazine*. 1 March.
- Ohrenschall, M. (2019). Exploring Consequences of the October BC Gas Pipeline Rupture. *Clearing Up.* 4 Jan.

Reference

- Penn State Univ. (ND). 6.2.1. The Averch Johnson Effect. *EBF 483 Introduction to Electricity Markets*. https://www.e-education.psu.edu/ebf483/node/681
- Nersesian, R.L. (2007). Energy for the 21st Century: A Comprehensive Guide to Conventional and Alternative Sources. NY: ME Sharpe. Ch 2 and 7—Electricity and natural gas.
- Sabatier, P. Weible, C. et al. (2018). The Advocacy Coalition Framework. In Sabatier, P. Weible, C. *Theories of the Policy Process.*

DISCUSSION QUESTIONS:

1. Can a Texas style crisis in 2021 happen in the Northwest? Why/Not?
2. Why might the operating and engineering attributes of gas turbines be particularly suited for deregulated electricity markets (R&M)?
3. What are the barriers to a clean energy transition from a public policy process perspective (Peters and PPT)?

Institutional Context for Northwest Energy Policy
Guest Lecturer: Jeff Hammarlund **(Back to Top)**
Required Reading:

- Hammarlund, J. (2002) "Oregon's Role as an Energy Innovator: A Historical Perspective". *Oregon's Future Journal*. Spring. (available on Canvas)
- Bonneville Power Administration (2021), *BPA Facts*
- Bonneville Power Administration (2021), *Fact Sheet-Preparing for a Resilient Columbia River Hydropower System*
- US Department of State (2022), *Columbia River Treaty (Official Website)*. *R*ead History and Background and Pressing Forward.
- Northwest Power and Conservation Council, *The State of the Columbia River Basin, Fiscal Year 2021*, pages 7-18.
- Brunner, J, (2011) "The High-Stakes Math Behind the West's Greatest River". Updated online version of article that appeared originally in *Forbes Magazine*, November.
- Hammarlund, J., (2001). "California's Search for Energy Incites Fear in the Northwest". *San Francisco Chronicle*, June 20. (Canvas)
- Barringer, F. (2018) ***Changing Currents: Picturing a Northwest Without Cheap Public Hydropower*****.** Stanford University, The Bill Lane Center for the American West, January 29.

News Article

- NEW: Paas-Lang, C. (2023). Money, power and an ecosystem are all at stake in Canada-U.S. negotiations over a massive river . *CBC.* 24 September. https://www.cbc.ca/news/politics/columbia-river-treaty-negotiation-1.6975849

Additional Recommended Reading:

- US Army Corps of Engineers, Bonneville Power Administration and Bureau of Reclamation (2003), *The Federal Columbia River Power System.*
- BPA and US Army Corps of Engineers (2013). *US Entity Regional Recommendation for the Future of the Columbia River Treaty After 2024 and Cover Letter*. December 13
- Congressional Research Service (2020), *Columbia River Treaty Review, December 15 Update*
- Sowards, A (2019). *Renegotiating the Columbia River Treaty, Six Decades Later*, (*High Country News*).

Reference

- Vogel, E. (2007). The Columbia river's region: Politics, place and environment in the Pacific Northwest, 1933-Present (Doctoral dissertation, University of Oregon). http://docs.streamnetlibrary.org/Theses-Disserts/Vogel2007-ColumbiaRiversRegion.pdf

DISCUSSION QUESTIONS:

1. The Northwest Power System has many features that are very similar to those found in other regions of the country, but it also includes a number of features that are quite distinctive if not entirely unique. What are some of the most important power system features that can be found in common in all parts of the country? What are some of the most important features are at distinctive in the Northwest? Why are these distinctive features important to development of Northwest energy policy?
2. How does the history of the NW energy system influence current policies?
3. How might the increase in fixed costs to protect salmon in the Columbia system impact NW energy supply and demand?
4. What are the major sticking points to the re-negotiation of the Columbia River Treaty? How do the current major issues in energy policy such as salmon extinction and resource adequacy affect the negotiations from each side of the border?

Integrated Resource Planning including Distribution Planning **(Back to Top)**
Guest Speaker: Angela Long Rockcress Consulting

Introductory Corner

- Wilson and Biewald. (2013). *Best Practices in Electric Utility Integrated Resource Planning: Examples of State Regulations and Recent Utility Plans*. The Regulatory Assistance Project. June**. EXECUTIVE SUMMARY, OREGON PP 13-15, AND CH 4.** SKIM THE REST http://www.raponline.org/wp-content/uploads/2016/05/rapsynapse-wilsonbiewald-bestpracticesinirp-2013-jun-21.pdf
- NW Energy Coalition. (2022). Lunch and Learn #1: Introduction to Utility Integrated System Planning. YouTube.

Required Reading

- OPUC. (2022). Order 22-390. Near-term guidance on Roadmap Acknowledgement and Community Lens Analysis the first Clean Energy Plans. 25 Oct. APPENDIX A TOPICS 1-5 (Appendix A pp. 23-35) ONLY. The full document can be found here.
- Oregon Legislative Assembly. (2021). Enrolled: House Bill 2021. SECTIONS 1, 2, 3, 4, and 6. Bill is here.

News Article:

- Trabisch, H. (2021). California's dilemma: How to control skyrocketing electric rates while building the grid of the future. 26 April. https://www.utilitydive.com/news/californias-dilemma-how-to-control-skyrocketing-electric-rates-while-buil/597767/

Recommended

- Homer, J.S. et al. (2022). Considerations for Resilience Guidelines for Clean Energy Plans. 7 Sept. OPUC. Here. REVIEW

Reference

- PGE. 2021. Distribution Plan. Part 1. **Executive Summary: PP 7-20** Other sections according to your interest. http://edocs.puc.state.or.us/efdocs/HAD/um2005had104621.pdf
- NEW: Pope, D. (2008). Nuclear Implosions: The Rise and Fall of the Washington Public Power Supply System. At PSU library.

DISCUSSION QUESTIONS:

1. What is the difference between Integrated Resource Planning and Oregon's Clean Energy Plans?
2. NW electricity rates are much lower than California's but will new regulatory requirements make energy less affordable for vulnerable customers?

Energy Efficiency and Demand Response/Demand Side Management **(Back to Top)**

Guest Speaker: Danielle Walker US DoE.

Introductory Corner:

- Randolph, J., & Masters, G. M. (2018). *Energy for sustainability: technology, planning, policy*. Island Press.
    - Chapter 8.1-8.5, Building Technologies
    - Chapter 16.1-16.3, Market Failures and Solutions
    - Chapter 18.1, State Energy Policy
- US DOE (2021). Energy Efficiency Policies and Programs.

Required Readings

- Nelson, H., Johnson, H. (2023). Data-Driven, Equity-Centered Energy Efficiency for Multifamily Properties. Working Paper. On Canvas.
- Cohn, C., and N. W. Esram. 2022. *Building Electrification: Programs and Best Practices*. Washington, DC: American Council for an Energy-Efficient Economy. aceee.org/research- report/b2201. EXECUTIVE SUMMARY
- DOE. (2022). Energy Saver: Inflation Reduction Act of 2022 - What it Means for You. https://www.energy.gov/energysaver/articles/inflation-reduction-act-2022-what-it-means-you
- Teague, K. (2022). Red States Still Pose a Major Threat to Biden's Justice40 Initiative, Activists Warn. Inside Climate News. 5 June.

Recommended Readings

- DOE. (2022). Clean Energy Corps. https://www.energy.gov/CleanEnergyCorps

References

- Nadel, S. (2012). *The Rebound Effect, Large or Small? http://aceee.org/files/pdf/white-paper/rebound-large-and-small.pdf*

- National Energy Screening Project. (2017). National Standard Practice Manual. https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/

DISCUSSION QUESTIONS:

1. What are the assumptions behind the nationwide estimates for energy savings—why haven't all cost effective energy savings technologies already been adopted?
2. Might public funds be justified in funding energy efficiency? Why / not?

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31 Oct

Incentivizing and Siting New Renewables (and Power Lines) **(Back to Top)**

Speaker: Hal T. Nelson

Introductory Corner:

- ODOE. (2020). Energy 101: Transmission Lines. In Oregon 2020 Biennial Energy Report. Pp 3-15 (103-115). https://energyinfo.oregon.gov/ber-2020
- US EPA. (2011). What is the National Environmental Policy Act. http://yosemite.epa.gov/r10/ecocomm.nsf/b9d67f6000e5b58888256e5900642421/e68df0446ae6daeb88256c3d006599fa!OpenDocument
- Cox, S. (2016). Financial Incentives to Enable Clean Energy Deployment. NREL/TP-6A20-65541 https://www.nrel.gov/docs/fy16osti/65541.pdf

Required Reading

- St. John. J. (2023). California takes big first step toward floating offshore wind. *Canary Media*. 27 Sept. https://www.canarymedia.com/articles/wind/california-takes-big-first-step-toward-floating-offshore-wind
- Nelson, H., Hass, S., Sarle, K., Renerie, A. (2021). Communities of Place vs Communities of Interest: Citizen Information and Locally Unwanted Land Uses. *Environmental Impact Assessment Review.* Link above and On Canvas.
- Sudd, R. et al (2023). How To Reform Federal Permitting To Accelerate Clean Energy Infrastructure A Nonpartisan Way Forward. Brookings Institution Policy Brief. February. https://www.brookings.edu/wp-content/uploads/2023/02/20230213_CRM_Patnaik_Permitting_FINAL.pdf

News Article

- Cart, J. (2023). 'Another attempt to industrialize the coast': California's Central Coast residents work to stop — or at least slow down — offshore wind. CalMatters. 16 Oct. https://calmatters.org/environment/2023/10/california-offshore-wind-central-coast/

Recommended: Siting

- NREL. (2018). Interconnection Seams Study. https://www.nrel.gov/analysis/seams.html
- Nelson, H., Swanson, B., Cain, N. (2018). Close and Connected?: The Effects of Proximity and Social Ties on Citizen Opposition to Electricity Transmission Lines. *Journal of Environment and Behavior.* Vol 50, Issue 5, pp. 567 – 596 . (Impact factor 3.15-2018) https://doi.org/10.1177/0013916517708598

Recommended: Financing

- Abolhosseini, S., & Heshmati, A. (2014). The main support mechanisms to finance renewable energy development. *Renewable and Sustainable Energy Reviews*, 40, 876-885. On Canvas.
- IRENA. (2023). Renewable Power Generation Costs in 2022. https://www.irena.org/Publications/2023/Aug/Renewable-Power-Generation-Costs-in-2022
- St. John, J. (2023). New tax-credit transfer rules could unlock $1T in cleantech investment. *Canary Media*. 18 August. https://www.canarymedia.com/articles/climatetech-finance/new-tax-credit-transfer-rules-could-unlock-1t-in-cleantech-investment

Reference

- Center for American Progress. (2023). *Understanding Direct Pay and Transferability for Tax Credits in the Inflation Reduction Act*. 5 June. https://www.americanprogress.org/article/understanding-direct-pay-and-transferability-for-tax-credits-in-the-inflation-reduction-act/
- National Academies of Sciences, Engineering, and Medicine. 2023. *Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions.* Washington, DC: The National Academies Press. https://doi.org/10.17226/25931.

DISCUSSION QUESTIONS:

1. What causes citizen opposition to energy facilities?
2. How we positioned are existing environmental impact assessments processes for siting new renewable technologies like offshore wind and wave?
3. What policies can be developed to scale up expensive renewable electricity technologies like offshore wind?

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7 Nov Energy Sector Economics and Modeling and Reliability: **(Back to Top)**

Guest Speaker: Rebecca Sexton Western Power Pool

Introductory Corner:

- Randolph, J., & Masters, G. M. (2018). *Energy for sustainability: technology, planning, policy*. Island Press. Chapter 3: Energy Futures.

Required Reading

- US EPA (2021). Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA). https://cobra.epa.gov/ BUILD A SCENARIO WITH THE TOOL
- EIA. (2021). Annual Energy Outlook Retrospective Review. TABLES 1 and 8A. https://www.eia.gov/outlooks/aeo/retrospective/
- NW Power Pool. (2023). WRAP 101. View first 4 short videos in the bottom right window of the WRAP webpage: https://www.westernpowerpool.org/about/programs/western-resource-adequacy-program

- NW Power Pool. (2022). Submission of Tariff to Establish Western Resource Adequacy Program. EXECUTIVE SUMMARY ONLY PP 2-8. AND IF INTERESTED ATTACHMENT B PP. 110+

News Article :

- Kiley, B. (2023). Seattle utilities consider massive efforts that could help green our grid. *Seattle Times.* 22 March. https://www.seattletimes.com/pacific-nw-magazine/seattle-utilities-consider-massive-efforts-that-could-help-green-our-grid/

Recommended

- NW Council. (2023). Pacific Northwest Power Supply Adequacy Assessment for 2027. 17 Jan. https://www.nwcouncil.org/reports/2023-1/
- Penn, I. (2022). Dodging Blackouts, California Faces New Questions on Its Power Supply. NYT. 25 Sept. https://www.nytimes.com/2022/09/25/business/energy-environment/california-energy-grid-heat.html PDF on Canvas as well.
- NW Council. (2021). The 2021 Northwest Power Plan: https://www.nwcouncil.org/fs/17680/2021powerplan_2022-3.pdf
    - Also, go to NW Council supporting material site map and read up on one subject that you are particularly interested in. Some possibilities are climate change, transportation electrification, energy efficiency assessment, etc. Hopefully that will make for some interesting questions in the class that get a bit more into the details. Here is the link for the supporting material: https://www.nwcouncil.org/2021powerplan_sitemap
- Chestnut, L.G., and Mills, D.M. (2005). A Fresh Look at the Benefits and Cost of the US Acid Rain Program. *Journal of Environmental Management*. 77 (3). November. Pp. 252-266. On Canvas.
- Carvallo, J.P. Et al (2023). A Guide for Improved Resource Adequacy Assessments in Evolving Power Systems: Institutional and Technical Dimensions. June. https://emp.lbl.gov/publications/guide-improved-resource-adequacy

Reference

- Varian, H. (2003). *Intermediate Economics*. 6th Ed. NY: Norton. CH 15.

Multi-criteria (attribute) decision-making

- Wang, J. J., Jing, Y. Y., Zhang, C. F., & Zhao, J. H. (2009). Review on multi-criteria decision analysis aid in sustainable energy decision-making. *Renewable and Sustainable Energy Reviews*, 13(9), 2263-2278. On Canvas.
- Pohekar, S. D., & Ramachandran, M. (2004). Application of multi-criteria decision making to sustainable energy planning—a review. *Renewable and sustainable energy reviews*, 8(4), 365-381. On Canvas.

Linear programming

- Vanderbei, R. J. (1996). *Linear Programming: Foundations and Extensions*. Boston : Kluwer Academic Publishers. Chapters 1&2. On Canvas

Sensitivity and scenario analysis

- Lane, et al. (2005). *Background Material B: Foresight Scenarios For The Uk Domestic Sector*. PP 1-8. Based on the report: http://www.foresight.gov.uk/Energy/Fuelling_the_Future_Nov_2000.pdf
- Kann, A., Weyant, J.P. (2000). Approaches for Performing Uncertainty Analysis in Large-Scale Energy/Economic Policy Models. *Environmental Modeling and Assessment* 5, 29-46. On Canvas.

DISCUSSION QUESTIONS:

1. If 1) natural gas price forecasts are unreliable (EIA, 2021) and 2) are arguably the most important driver of future marginal electricity costs, what is the purpose of energy modeling?
2. What are some of the new metrics that have been developed for resource adequacy and how are they different from older metrics like reserve margin?
3. Why haven't the full range of co-benefits of renewable energy and efficiency been included in modeling estimates (US EPA)?

Carbon and Renewables Regulation **(Back to Top)**

Community-Scale Renewable Energy Systems

14 NOV Guest Speakers: Pam Marsh, Nora Apter, Meredith Connelly

(Zoom Only)

Introductory Corner

- Randolph, J., & Masters, G. M. (2018). *Energy for sustainability: technology, planning, policy*. Island Press. Chapter 10 **OR** 11 (based on your interests), Chapter 12.

Required Reading

- OR DOE. (2023). 2023 Oregon Legislative Report. READ SEVERAL SUMMARIES OF YOUR CHOICE & HB 3409/SB 870: Building Performance Standard https://www.oregon.gov/energy/Data-and-Reports/Documents/2023-ODOE-Legislative-Report.pdf.
- City of Portland. (2023). Climate Investment Plan. August. EXECUTIVE SUMMARY & SKIM ONE ADDITIONAL SECTION OF YOUR CHOICE. https://www.portland.gov/bps/cleanenergy/climate-investment/documents/pcef-climate-investment-plan/download

News Article:

- Wosniaka, G. (2023). Will massive clean-energy fund take Portland to its climate goal? No – and that's not its objective. 26 Sept. *OregonLive.* https://www.oregonlive.com/environment/2023/09/will-massive-clean-energy-fund-take-portland-to-its-climate-goal-no-and-thats-not-its-objective.html

Recommended

- COINversation. (2023) Need for and Complexity of Changing Oregon's Quorum Rule: https://www.coinoregon.org/events/coinversations; then scroll down to "A Quorum COINvesation" that took place on September 12 and click on the video. The video is on YouTube but the link above also takes the viewer to the panelist bios.

- WA Dept of Ecology. (2023). Cap-and-Invest Linkage Criteria: Preliminary Analysis Report. October. https://apps.ecology.wa.gov/publications/summarypages/2314005.html
- Nelson, H. (2008). Planning Implications from the Interactions between Renewable Energy Policies and Carbon Regulation. *Environmental Planning and Management.* 51 (4). July. pp. 581-96. On Canvas

Reference

- Gertner, (2015) The Secrets in Greenland's Ice Sheet *New York Times.* *http://www.nytimes.com/2015/11/15/magazine/the-secrets-in-greenlands-ice-sheets.html?emc=eta1&_r=0*
- National Research Council. (2013). *Abrupt Impacts of Climate Change: Anticipating Surprises*. http://www.nap.edu/catalog.php?record_id=18373 Summary PP 1-18 ONLY.
- Pizer, W. (2002). Combining Price and Quantity Controls to Mitigate Global Climate Change. *Journal of Public Economics*. 85. pp. 409-434. On Canvas.
- Weitzman, *M. (2009).* On Modeling and Interpreting the Economics of Catastrophic Climate Change. *Review of Economics and Statistics*. 61 (1). P. 1-19. On Canvas.
- Partnership for Market Readiness (PMR) 2017. *Carbon Tax Guide: A Handbook for Policy Makers*. Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO https://openknowledge.worldbank.org/bitstream/handle/10986/26300/Carbon%20Tax%20Guide%20-%20Main%20Report%20web%20FINAL.pdf?sequence=1&isAllowed=y

DISCUSSION QUESTIONS:

1. Why should Portland raise money to combat global weirding when its carbon emissions are miniscule compared to global emissions?
2. How do building performance standards differ from traditional energy efficiency programs? Should they also include distributed (rooftop) renewable energy?

Electric Vehicles and Energy Justice **(Back to Top)**

21 Nov Guest Speaker: Sylvie Ashton TURN

Introductory Corner

- ODOE. (2022). Oregon Biennial Energy Report: Energy Resource & Technology Review: Clean & Efficient Vehicles: pp. 140-158. https://energyinfo.oregon.gov/ber

Required Reading

- Ashford, S., Chhabra. (2023). Reforming CA's Electric Rates for Decarbonization and Equity. 14 April. https://www.nrdc.org/bio/sylvie-ashford/reforming-cas-electric-rates-decarbonization-and-equity
- Washington State Dept of Commerce. (2023). Transportation Electrification Strategy (TES) DRAFT. https://deptofcommerce.app.box.com/s/sz7bei0ug018dqio3u3wqkgblqd1yanl

- Mariel Thuraisingham (2022) Centering Equity in Washington's Clean Energy Transition https://frontandcentered.org/centering-equity-in-washingtons-clean-energy-transition/
- NEW: Carley, S., Engle, C., & Konisky, D. M. (2021). An analysis of energy justice programs across the United States. *Energy Policy*, 152, 112219. On Canvas

NEWS ARTICLE:

- NEW: Sadasivam, N. (2023). Biden's EV charger rollout has begun. Will it deliver on environmental justice? *Grist* 11 July. https://grist.org/transportation/biden-ev-charger-network-environmental-justice/

Recommended

- NEW: Elmallah, S., Reames, T. G., & Spurlock, C. A. (2022). Frontlining energy justice: Visioning principles for energy transitions from community-based organizations in the United States. *Energy Research & Social Science*, 94, 102855. On Canvas
- Fowlie, M. (2023). Who's Afraid of Retail Electricity Rate Reform?. 17 April. UC Energy Institute at Haas Blog. https://energyathaas.wordpress.com/2023/04/17/whos-afraid-of-retail-electricity-rate-reform/

Reference

- PNNL. (2020). Electric Vehicles at Scale: Phase 1 Analysis. July. EXECUTIVE SUMMARY. On Canvas

DISCUSSION QUESTIONS:

- Why do programs and policies that utilize first-come, first served customer recruitment usually end-up increasing inequities?
- Which is more inequitable: large fixed charges on utility bills or higher per unit (therm/kWh) unit costs?

Grid Modernization, Rate and Market Design **(Back to Top)**

28 Nov Guest Speaker: Pam Sporborg PGE

Introductory Corner

- PowerMag. (2018). How does the Western Energy Imbalance Market Work?. 1 Oct. https://www.powermag.com/how-does-the-western-energy-imbalance-market-work/
- US AID. (2021). Primer on Rate Design for Cost-Reflective Tariffs. January. https://pubs.naruc.org/pub.cfm?id=7BFEF211-155D-0A36-31AA-F629ECB940DC

Required Reading

- Hausker, C. (2021). Power Market Design for an Era of Rapid Decarbonization. *NRRI Insights*. Oct. https://pubs.naruc.org/pub/96C4BEAF-1866-DAAC-99FB-D4C1060DDF7D
- Nelson, H. (2020). *What if We Build it and Nobody Comes?* Transactive Energy Systems (TES) Conference. 8 December. 10 minute Video link

- NEW: Mullin, R. (2023). CREPC-WIRAB Conference Tackles Western Market Developments. *RTO Insider.* 9 Oct. On Canvas.

NEWS ARTICLE:

- Colthorpe, A. (2022). FERC Order 2222: Has the promised game changer for US distributed energy resources failed? *Energy Storage News.* 16 November. https://www.energy-storage.news/ferc-order-2222-has-the-promised-game-changer-for-us-distributed-energy-resources-failed/

RECOMMENDED

- St. John, J. (2021). Can customers' batteries, thermostats and EV chargers keep California's grid up and running? 12 Oct. *Canary Media*. https://www.canarymedia.com/articles/grid-edge/can-customers-batteries-thermostats-and-ev-chargers-keep-californias-grid-up-and-running

Reference

- FERC. (2020). FERC Opens Wholesale Markets to Distributed Resources: Landmark Action Breaks Down Barriers to Emerging Technologies, Boosts Competition. https://www.ferc.gov/news-events/news/ferc-opens-wholesale-markets-distributed-resources-landmark-action-breaks-down

DISCUSSION QUESTIONS:

1. What does the future of the electricity grid look like given smart appliances, storage, electrification, and distributed generation?
2. How can we create incentives that promote investment in innovative technologies by utilities, customers, and private industry but that apply to a wider range of customers than (typically white/Asian) single-family detached homeowners?

Week 11: Course Held at Regular Time During Finals Week! (Back to Top)

Where the Rubber Meets the Road (Back to Top)

Dan James BPA 6:40 on Zoom

- Paper Presentations
- Course Evaluations: https://portlandstate.qualtrics.com/jfe/form/SV_40E9FUZZ32T1wa2
- Team Paper Evaluations https://forms.gle/ezWNNaqJjvrU5Gu99

Introductory Corner

- BPA. (2018). 2018-2023 Strategic Plan. https://www.bpa.gov/-/media/Aep/about/who-we-are/strategic-plan/2018-strategic-plan.pdf
- Also see the 2020 update here: https://www.bpa.gov/-/media/Aep/about/who-we-are/strategic-plan/2020-strategic-plan-update.pdf

Required Reading

- BPA. (2023). Provider of Choice (Post-2028). SKIM: *Meeting slide deck: Overview of draft Provider of Choice Policy*. 26 July. Under Meeting Materials. https://www.bpa.gov/energy-and-services/power/provider-of-choice

- Nelson, H. (2020). Electrify Everything? Heat and Light in Deep Decarbonization Policies*. Public Utilities Fortnightly.* Jan. pp. 62-67. https://www.fortnightly.com/fortnightly/2020/01/electrify-everything?authkey=88797425a2dfc29e2603efc4c5c5d6456577351fbd74219b22a45477b39033fa
- Tainter. J.A. (1995). Sustainability of Complex Societies. *Futures.* 27 (4). Pp. 397-407. ON CANVAS.

Recommended

- BPA. (2023). News Articles and Publications. PICK 1 or 2 ARTICLES TO READ: TC-25 Tariff Proceeding (6 Nov) is related to Rebecca Sexton's talk RE interconnecting new renewable electricity facilities https://www.bpa.gov/about/newsroom/news-articles

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More Resources

Accommodations for Students with Disabilities: PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment. If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC is located in 116 Smith Memorial Student Union, 503-725-4150, drc@pdx.edu or https://www.pdx.edu/drc

If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.
Please be aware that the accessible tables or chairs in the room should remain available for students who find that standard classroom seating is not useable.

- Mental Health Resources: Graduate school is a context where mental health struggles can be exacerbated. If you find yourself struggling, please ask for help. If you wish to seek out campus resources, here is some basic information about mental health resources at PSU: https://www.pdx.edu/shac/counseling

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Title IX Discrimination and Harassment Policy**:** As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. We expect a culture of professionalism and mutual respect in our department and class. You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life.

- Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment or sexual violence to a confidential employee who does not have this reporting responsibility, you can find a list of those individuals. For more information about Title IX, please complete the required student module Creating a Safe Campus in your Canvas.