

Energy and Environment
Winter 2024 ENVS 12
Thursday & Thursday 2:25-4:15
X-Hour Wed 5:30-6:20

Professor Elizabeth Wilson
105 Steele Hall

Office Hours: Tues and Thurs 12:00-1:15, schedule here:
<https://calendly.com/elizabethjw/office-hours-envs-12>

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Class Canvas site: <https://canvas.dartmouth.edu/courses/63407>

Multimedia Resources: <https://researchguides.dartmouth.edu/multimedia>

Class: Berry 180

In this class we will explore energy, technology, environmental issues and the evolving political context and response. We will examine the interplays between technological systems and social systems, trying to better understand how technology has played a key role in both creating and mediating environmental impacts. We will use a diverse set of tools and methodologies to examine energy/environmental systems from many different angles and understand how energy systems work, explore the larger impacts of the energy system and examine implications of technology and policy choice. This will allow us to better evaluate the environmental and social implications of different energy options in a changing future. By understanding how these issues interact at the local, state, regional, national and international levels I hope that we will be able to understand the global and local forces shaping energy-environment systems.

By its very nature, this study will be interdisciplinary and multi-scalar. Lectures and discussions will focus on methods from engineering, political science, physics, sociology and economics. This course will cover local energy use and impacts, national policies and the global trends that shape the energy system. We will examine energy use in history, study the present energy/environmental systems and explore the challenges of transforming the energy system.

Course Structure and Goals

This class will be taught using active learning techniques is roughly broken into four parts. Part 1 will help to build a set of basic tools (unit analysis, economic cost calculations, and introduce ‘back of envelope’ calculations) and familiarize you with the system underpinnings (environmental systems, energy units, infrastructure) to explore energy and environmental issues. Part 2 will examine how humans use energy, and Part 3 explore the transformations in the electric sector. Part 4 covers cross-cutting issues like energy transitions, and energy poverty and development. Each part will cover energy production, use, and policy, associated environmental impacts, and incorporate history, technology, regulation and geopolitical considerations as well as cross-cutting issues.

By the end of this term I hope that you will be able to:

- Understand and use basic energy units and conversion factors and be able to perform basic “back of the envelope” calculations on energy and environmental technologies.
- Understand opportunities and challenges of existing energy infrastructure and emerging technologies.
- Understand the existing regulatory environment and the role of public policy in shaping energy and environmental planning.
- Be able to become a discerning participant/observer within the energy and environmental debate, examining the literature, institutions, and technologies with a critical and informed eye.
- Be familiar with different communication methods: academic paper, policy brief, and video project to address a critical energy issue.

Required Texts

Bradford, Travis, 2018, The Energy System, MIT Press, Boston

Additional required articles and assignments will be made available on the class Canvas site. We also have books available in our Library rooms. Please ensure that you can view and contact Kim Wind if you need any help.

Grading

20% Daily questions and text annotation

30% Three problem sets containing both qualitative and quantitative elements
(10% each)

40% Final Group Presentation, including video and policy-brief (15% presentation, 15% video project, 10% policy brief)

10% Participation class discussion, back of envelope

Daily Questions and Text Annotation

For each of the assigned readings prepare at least two questions or comments. These daily questions or comments should be 3-5 sentences in length and should be posted on Canvas by **3pm the day before each class** when daily questions are due, so we can address them in lecture the following day. Note that the questions can only be read by the course instructors. We will share the questions with guest speakers beforehand to help them target their presentations. Questions will be scored

1=poor (your question required very little reflection on the reading);

2=good (it's evident that you read the paper, but you only put a moderate amount of thought into the question);

3=excellent (it's clear that you read the paper carefully and put a lot of effort into reflecting on the reading and formulating a question).

The objectives of these required "daily questions" are:

- to provide practice at critical thinking
- to give us constant feedback on your level of understanding
- to help move classroom focus to issues you find interesting and important
- to increase the likelihood that required reading will be completed in a timely fashion

NOTE: You are **not allowed** to use ChatGTP (or equivalent) for this part of the course

What types of questions make good questions for discussion?

A question should indicate some depth of thought, and not just be, "why did the author want to study ABC?" A question could be something you don't understand (e.g., "'what is smart grid and why should it affect system cybersecurity?', "under cap-and-trade policies how are greenhouse gas emissions measured and how are caps enforced?"), or that seems to contradict something else we've heard (e.g., "how can we reconcile these results with those of Sarah Smith who found opposite results in her analysis?") or something that was not clarified by the paper in question. Comments could for instance, indicate what you think is a novel approach by the author; highlight an important, but underemphasized point; make a linkage with another paper we read previously, etc. Or perhaps you might disagree with the data, methods, interpretation of data, interpretation of results, conclusions, speculation, or extrapolation.

TEXT ANNOTATION will use the Hypothes.is tool to group annotate class readings. We will focus on the textbook and other class readings with the goal of encouraging active reading and collective engagement with the material.

Problem Sets

The three **problem sets** will cover quantitative and qualitative material covered in the class. You will be asked to calculate basic 'back of the envelope' information on a variety of different subjects as well as provide qualitative synthesis of the different articles and speakers coming to the class. You are encouraged to do individual work supported within a larger study group (i.e. do your own work but use the other course members as resources for help and support) and to discuss the problems and your analyses with your fellow students.

Problem set grading: The **quantitative questions** will be evaluated on your thinking process (outlining your problem, stating your assumptions, showing your work, explaining your thinking process as clearly as possible) as well as the answer obtained. In some cases, there will be a 'correct' response, in others, the value of the problem is your thinking process and the underlying logic of the assumptions that you made while solving the problem. Underlying message: *think*. For the qualitative questions, they aim to examine your comprehension and assimilation of course readings and material, These will be graded on a 5-point scale, with a 5 denoting a well-researched and supported response, 4 a response with most of the logic correct, but with up to two errors in logic or calculation, and a 3 for problems with more than two errors in logic or calculation, but still an overall grasp of some basic concept, and a 0 for problems not set up or calculated correctly. Use references and draw from the readings.

Presentation Days: Policy Brief and Video Investigation Project

During the course, students will develop presentations with their groups on some issue related to the energy and environment. Groups should work together to come up with a topic that explores in greater detail and in more depth an issue raised in class or one related to the course content that was not covered in class. The purpose of this assignment is for you to explore an issue in greater depth than we have time to cover in lectures and teach your peers and instructors about it. Examples of possible topics include: "Evaluation of Renewable Funding Programs", "Review/critique of laws and legislation in New England related to solar plant siting and renewable energy", "Review of status of transmission line siting for low carbon energy in New Hampshire", "Evaluation of 'eating local' culture on energy use", or others of your choice. Each team will be responsible for a 15-minute presentation of your group's Video Investigation Project and policy brief. Be creative! Ask good questions! You will have the opportunity to evaluate the participation of your group members for their final grades.

Video Investigation Group Project

The Video Investigation Project is a combination of policy analysis, calculation and presentation skills will require your group (4 students) to prepare a **short 5-minute** video. This will be accompanied by a 10-minute presentation to the class, and 5-page policy brief on a topic selected and refined with the professor. The background and supporting evidence will use the tools you are taught in class. You will be divided into teams that will

research and analyze an assigned energy/environmental issue. You are responsible for ensuring that these groups function smoothly, guidelines are provided in the video investigation project materials.

Your group will be responsible for 1) scoping the question; 2) developing the quantitative and qualitative analysis, 3) defining an interesting and relevant angle and 4) evaluation of applicable policies. In doing so, you will consult with relevant experts in the field, and other universities, use the peer-reviewed literature, draw on material from other courses, and use documents produced by federal and state governments and private consultants, etc...). Your analyses will serve as the base to write, plan, film, record, edit and present the final video and policy brief.

The goal of this project is to help your group prepare to research and communicate complex energy and environmental policy issues to an educated population and provide a supporting policy brief, supported by relevant policy analysis of difficult, yet pertinent questions. In doing so, I hope you reach a more nuanced understanding of the issue at hand and policy tradeoffs. Grading for the group project will be assessed on both an individual and collective basis. This is the culminating part of this class. Grading is as follows:

video investigation product (15% of grade) and accompanying policy brief (10% of grade).

Examples, templates and the grading of the elements of the video investigation project are posted on the course Canvas site.

Class Participation

In terms of **class participation**, I expect each student to come to class having read the day's reading and responded to the posted questions on the Canvas Site, responses to the readings due at noon the day before class. The format of the class will be a hybrid. While some lectures remain, the class will mainly be taught as a "flipped class", where do the readings and answer questions BEFORE class, we use the class time to resolve complex issues and delve deeper into the material.

We will follow all College guidelines regarding accessibility and the **Academic Honor Principle**. If you have a disability, please see **Student Accessibility Services** so that we can make the necessary accommodations.

Academic Honor Principle: You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a College academic record; or fabricating or falsifying data, research procedures, or data

analysis. (<https://student-affairs.dartmouth.edu/policy/academic-honor-principle>) If it is determined that a student has cheated, he or she may be given an "E" for the course and may face additional sanctions.

Grading policy will follow the standard College policy, https://www.dartmouth.edu/~reg/transcript/grade_descriptions.html

Please turn in assignments online. Assignments turned in **late** will lose three points for every day after the due date.

Assignment	Due Date
Problem set 1	January 18
Video Treatment Plan 1	February 1
Problem set 2	February 1
Video project DRAFT, interview footage completed and review	February 15
Problem set 3	February 20
Policy brief DRAFT due	February 16
Policy brief due	February 23
Final presentations and videos	Feb 27 and 28

Student Standards of Conduct Code: The College seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the College seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the College; and that does not threaten the physical or mental health or safety of members of the College community.

To review the Standards of Conduct Code, please see: <https://student-affairs.dartmouth.edu/policy/standards-conduct>

Artificial intelligence (AI) language models, such as ChatGPT, may be used with appropriate citation in research, but not for daily questions, problem sets, policy brief or other in class assignments. If you are in doubt as to whether you are using AI language models appropriately in this course, I encourage you to discuss your situation with me. Examples of citing AI language models are available at: libguides.umn.edu/chatgpt. You are responsible for fact checking statements composed by AI language models. For help with proper referencing, see <https://writing.dartmouth.edu/support/sources-and-citations>

Use of Personal Electronic Devices in the Classroom: Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class.

Artificial intelligence (AI) language models, such as ChatGPT, may be used with appropriate citation in research, but not for daily questions, problem sets, policy brief or other in class assignments. If you are in doubt as to whether you are using AI language models appropriately in this course, I encourage you to discuss your situation with me. Examples of citing AI language models are available at: libguides.umn.edu/chatgpt. You are responsible for fact checking statements composed by AI language models.

Appropriate Student Use of Class Notes and Course Materials: Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community.

Student Mental Health and Stress Management: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. Dartmouth College services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via <https://students.dartmouth.edu/health-service/counseling/about/clinical-services/counseling/>.

Equity, Diversity, Equal Opportunity, and Affirmative Action:

The College will provide equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult <https://student-affairs.dartmouth.edu/policy/nondiscrimination-equal-opportunity-and-affirmative-action>

Academic Freedom and Responsibility: Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for

critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Provost.

Contacting Us: We respond to emails during normal business hours, M-F, 9-5.

Class Structure

Week 1	Thursday	4-Jan	Intro and Class Structure
2	Tuesday	9-Jan	Tools: UNITS and Intro to the Energy System with Amanda Graham
		11-Jan	Tools: Video Project Intro with Susan Simon & Histories of Environmental and Energy Pollution
3		16-Jan	Tools: Library Resources and Environmental Management (Librarian Amelia Looby)
		18-Jan	Energy and Climate Change (Guest Speaker Tyler Hansen)
4		23-Jan	Principles for Energy Efficiency (Guest Speaker Rebecca Foster) and Synthesis
		25-Jan	Contexts for Change: Climate and Energy Politics
5		30-Jan	Video and Policy Brief Workshop
		1-Feb	Offshore Wind Power: Promises and Perspectives on Development Guest Speaker: Tyler Hansen
6		6-Feb	Transforming Legacy Energy Systems
		8-Feb	Contexts for Legacy Energy System Transformations (Guest Speaker J Drake Hamilton)
7		13-Feb	Energy System Transformations: Climate and Adaptation
		15-Feb	Energy System Transformations: Electricity 1 (Guest Claire Reicher, American Clean Power)
8		20-Feb	Energy System Transformations: Electricity 2
		22-Feb	Energy in Developing Countries: Africa (Guest Mothibi Penn-Kekana)
9		27-Feb	Student presentations and Videos
	X HOUR	28-Feb	Student presentations and Videos**NOTE X HOUR
10		3-Mar	Wrap Up and Evaluations

Reading and Watching List

Week 1

Thursday January 4: Introduction

- Overview of syllabus
- Meet Support Librarian Amelia Looby
- How to do the homework assignments
- ON CANVAS: Problem Set 1
- Group Meet and Mingle Activity

- Readings:
 - Jahren, 2020, The Story of More, Energy Chapter 10
 - Video: Hope Jahren on the book: <https://www.youtube.com/watch?v=-AKn91lzHaA>
 - Bradford Chapter 1

Week 2

GOALS: You will understand unit analysis and video investigation project as well as dip your toes into the energy system and environmental history of pollution

Tuesday January 9:

Methods for the Madness 1: Unit Analysis and Energy Opportunities

Amanda Graham Academic Director, Irving Inst. For Energy and Society at 3pm

Readings:

- Bradford, Chapter 1 (review)
- Bradford Chapter 2 , 37-79 (Pay special attention to 38-43 and 48-58)
- Jahren, 2020, The Story of More, Energy Chapter 10

Units and dimensional analysis:

- Energy Conversions (MIT Energy Club Fact Sheet),
http://www.mitenergyclub.org/assets/2008/11/15/Units_ConvFactors.MIT_EnergyClub_Factsheet.v8.pdf

Video: <https://www.youtube.com/watch?v=nAIUfcxzQKk> – “Energy units 101”. Good video that gives a nice breakdown of energy, power and related units. (2min47sec)

Video: Energy 101: Learning the language of energy part 1,
https://www.youtube.com/watch?v=3fN6-ATpHU&list=PLXnV377qgwcdYrXbK1VsafDBwb_YvKcOO&index=2 12 minutes

Video: Energy 101: Learning the language of energy part 2,
https://www.youtube.com/watch?v=xHAGMYRNzyg&list=PLXnV377qgwcdYrXbK1VsafDBwb_YvKcOO&index=3

- Student Energy YouTube channel- the “Energy Literacy” playlist has great videos on Energy units and different types of energy technologies.
<https://www.youtube.com/c/studentenergy/playlists>

Thursday January 11:

Video Investigation Project and Course Resources (MEET AT JONES MEDIA LIBRARY 2:25)
And Histories of Environmental and Energy Pollution

Meet with Jones Media Library Susan Simon at 2:25, return to classroom at 3:30.

Readings:

- Tarr, Joel A. 1996. The Search for the Ultimate Sink: Urban Pollution in Historical Perspective. Akron, Ohio, Chapter 1
 - Holdren, John P. 1990 Energy in Transition, Scientific American. 263(3):157-164
 - Pacala, S., and R. Socolow. 2004. Stabilization Wedges: Solving the Climate Problems for the Next 50 Years with Current Technologies. Science 305:968-972.
- Optional: Video of Rob Socolow on the Wedges here:
<https://www.youtube.com/watch?v=0Cr18jYiUsk>

Week 3

Tuesday January 16: Principles for Energy and Environmental Management
And Course Resources

Guest: Librarian Amelia Looby on ENVS 12 Energy Resources

Review:

<https://researchguides.dartmouth.edu/energy>
<https://researchguides.dartmouth.edu/envs12>

Readings:

- Rosenbaum, Walter. A, 2018, Chapter 2: Making Policy: The Process, In Environmental Politics and Policy, 11th Edition, CQ Press. Washington DC
- Rosenbaum, Walter. A, 2018, Chapter 3: Making Policy: Institutions and Politics, In Environmental Politics and Policy, 11th Edition, CQ Press. Washington DC
- Kraft, Michael E., and Norman Vig. 2018, Environmental Policy Over Four Decades. In Environmental Policy: New Directions for the Twenty-first Century,

10th edition, edited by Kraft, Michael E. and Norman Vig, pp. 1-26,. CQ Press, Washington D.C.

Thursday January 18: Climate Change, the Environment and Air Quality

Guest: Tyler Hansen, Research Scientist, ENV5, Dartmouth

- Zamuda, C., D.E. Bilello, G. Conzelmann, E. Mecray, A. Satsangi, V. Tidwell, and B.J. Walker, 2018: Energy Supply, Delivery, and Demand. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 174–201. doi: 10.7930/NCA4.2018.CH4
<https://nca2018.globalchange.gov/chapter/4/>
- IPCC, 2023: Summary for Policymakers. In:
https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf
- Other Resources:

EPA Greenhouse Gas equivalencies calculator. Great site for calculating impact metrics. <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Week 4

VIP: Groups and Topics Decided

PLEASE SUBMIT DQ and QUESTIONS FOR Rebecca Foster by 1pm MONDAY. THANKS!

Tuesday January 23: Energy Transitions in Context

Guest: Rebecca Foster VEIC CEO

Specian and Bell-Pasht, 2023, Energy Efficiency in a High Renewable Energy Future, ACEEE, <https://www.aceee.org/research-report/u2303>

Reams, Tony, 2016, [Targeting energy justice: Exploring spatial, racial/ethnic and socioeconomic disparities in urban residential heating energy efficiency](#), *Energy Policy* [canvas.dartmouth.edu]Download [Targeting energy justice: Exploring spatial, racial/ethnic and socioeconomic disparities in urban residential heating energy efficiency](#), *Energy Policy* [canvas.dartmouth.edu]

Version Jan 3 2024

- Tik Root, Jan 21, 2022, After Decades Biden Plans to make Manufactured [Homes more Efficient, \[canvas.dartmouth.edu\]](#) Download [Homes more Efficient, \[canvas.dartmouth.edu\]](#) Washington Post
- [https://www.washingtonpost.com/climate-solutions/2022/01/21/mobile-home-efficiency-climate/Links to an external site. \[washingtonpost.com\]](https://www.washingtonpost.com/climate-solutions/2022/01/21/mobile-home-efficiency-climate/Links-to-an-external-site.-[washingtonpost.com])

Thursday Jan 25: Contexts for Energy Transitions

Video: Leah Stokes, "Interest Groups and the Battle Over Clean Energy and Climate Policy", <https://www.youtube.com/watch?v=zGoyArNOqY8> (1 hour)

- Mayer, Jane, 2017, Dark Money, Chapter 8, 243-278
- Richard Heede, 2017, Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010
- Hoffman, Andrew, 2012, Climate Change as Culture War, Stanford Social Innovation Review, 31-36, http://www.ssireview.org/articles/entry/climate_science_as_culture_war

This week's additional resources:

Diana Hernandez, Columbia, (1 hr) Energy, poverty and health in a changing climate, https://www.youtube.com/watch?v=G2CsOAWB3t8&list=PLXnV377qgwcfm_NhVijX9A8ZPbuSpn11-&index=3

Equity and Energy considerations:

Video: Erin Mayfield, (~1 hour) "Prioritizing Social Equity in Infrastructure Transitions to Achieve Net Zero Emissions."

https://www.youtube.com/watch?v=--bnHvTTUqg&list=PLXnV377qgwcfm_NhVijX9A8ZPbuSpn11-&index=5

Week 5

ASSIGNMENTS Due Feb 1:

- VIDEO [Treatment Plan](#) DUE
- Problem Set 2 Due

Tuesday January 30: Energy Efficiency in Action and Video Work Day

- Bradford, 2018, Chapter 17 p 869-921

- Nadel, Steven. 2002. Appliance and Equipment Efficiency Standards. Annual Review of Energy and the Environment 27:159-92.
- Lazar, J, Regulatory Assistance Project, 2016 Electricity Regulation in the US, pages 120-141, Energy Efficiency programs and Renewables, <https://www.raonline.org/knowledge-center/electricity-regulation-in-the-us-a-guide-2/>
- Video: Amory Lovins, RMI on efficiency <https://www.greenbiz.com/video/amory-lovins-expanding-efficiency-cornucopia> (26 minutes)

FOR PROBLEM SET See extra resources on Canvas, including: [Rubin, Ed, 2001 Intro to Engineering Energy and Environment: Economics](#) Chapter 13

Additional Resource Article:

Forrester and Reams 2020, Understanding the residential energy efficiency financing coverage gap and market potential, *Energy Policy*

Thursday Feb 1: Offshore Wind

Guest Speaker: Tyler Hansen, Research Scientist, ENVS Dartmouth

Readings TBA

Week 6

Tuesday February 6: Legacy Energy System Transformations

- [Stokes, Leah, Short Circuiting Climate Policy, Chapter 3](#)
- Bradford Chapter 4 and 5 (use library reserves, if you have trouble check with a librarian, <Lisa.A.Ladd@dartmouth.edu>)
- [Lazar, J, Regulatory Assistance Project, 2016 Electricity Regulation in the US, pages 1-36 : Download Lazar, J, Regulatory Assistance Project, 2016 Electricity Regulation in the US, pages 1-36](#)

Additional Readings: [Davies et al Chapter 5 on the Electric System](#)

Thursday February 8: Contexts for Energy System Transformations

GUEST SPEAKER: J. Drake Hamilton, Fresh Energy

Readings:

- Rosenbaum, Walter. A, 2018, Chapter 6 command and control in Action: Air and Water Pollution Regulation, In Environmental Politics and Policy, 11th Edition, CQ Press. Washington DC
- [Climate Smart Development: Adding up the benefits of actions that build prosperity, end poverty and combat climate change](#). World Bank/ClimateWorks Foundation, 2014. *Read the executive summary and skim the rest please.*
- Dawson, Madeline, 2023, Minnesota joins 20 other states in pursuit of 100% clean energy <https://www.eesi.org/articles/view/minnesota-joins-20-other-states-in-pursuit-of-100-percent-clean-energy>, EESI

Optional Readings:

- [State of Global Air 2020](#), Health Effects Institute, 2020.

Week 7

Tuesday Feb 13: Energy System Transitions Global Considerations

Daily Questions

Class Presentations: Team up and present on key topics

Lazar, J, Regulatory Assistance Project, 2016 Electricity Regulation in the US, pages 37-120. <https://www.raponline.org/knowledge-center/electricity-regulation-in-the-us-a-guide-2/>

Bradford Chapters 8, 9,10,11

POLICY BRIEF ASSIGNMENT

Optional Materials:

Watch: <http://www.bbc.co.uk/learningzone/clips/vehicles-and-air-pollution/6010.html>

Thursday February 15: Electric System Transformations: Carbon Free Energy and Renewables

Guest Speaker at 2:30: Claire Reicher, Director of Offshore Wind America Clean Power <https://cleanpower.org/about/team/claire-reicher/>

Class Presentations: Team up and Present on Key topics

- Lazar, J, Regulatory Assistance Project, 2016 Electricity Regulation in the US, pages 37-120. <https://www.raonline.org/knowledge-center/electricity-regulation-in-the-us-a-guide-2/>
- Bradford Chapters 8, 9,10,11

Optional Materials:

Watch: <http://www.bbc.co.uk/learningzone/clips/vehicles-and-air-pollution/6010.html>

[Additional Resources:](#)

Videos on the US energy system

- **“How much energy does the U.S. use?”**
<https://www.youtube.com/watch?v=zN4jaRoP2AA> (2mins)

Good overview of US energy system that breaks down the US energy mix, and how the different sources of energy (Nuclear, Oil, Gas, Green, and Coal) are used throughout the economy.

- **“How America can leave fossil fuels behind, in one chart.”**
<https://www.youtube.com/watch?v=QfAXbGlnwno> (12 mins)

V interesting video that explains (using a Sankey Diagram!) how the US energy system could be decarbonized. Video was published earlier this year and is closely related to ongoing political discourse. Narrator gives a great explanation of the Sankey diagram for the US. Definitely worth watching!

- **“How Energy got so Cheap” – WSJ**
<https://www.youtube.com/watch?v=U1wNUaFOkJc> (6 mins)

Nice video that explains economics of energy prices. Talks about growth of US shale gas production, the effect of COVID, OPEC ect. One for the economists.

- **“Integrating Renewable energy into the US Electrical Grid” - Ted talk by Dr. Rob Maher** <https://www.youtube.com/watch?v=0oo2CeEkn40> (10 mins)

Good video that discusses the practical challenges of making the US electrical grid more sustainable. Great overview of the US electrical grid, too. Highly recommended. He is almost as engaging as Prof Wilson!!

- **“The Electrical Grid 101” –** <https://www.youtube.com/watch?v=nbPmsBmo03Y> (4 mins)

Good overview of the Electrical grid, and how energy gets from the power plant to the home.

- **“Why Transitioning to only renewable energy will be difficult for the US.” - PBS news.** <https://www.youtube.com/watch?v=MifhQIOiPIM> (5 mins)

Interesting discussion that presents a strong case for Nuclear.

Global energy system

- **“How to Fuel the future”** <https://www.youtube.com/watch?v=d325ohXLxE> – The Economist. (4 mins)

Good video that explains some of the Geopolitics global energy, the historical importance of Oil, Energy self-sufficiency, and how future energy demands will be met.

- **“The future of Energy Storage Beyond Lithium.”** <https://www.youtube.com/watch?v=EoTVtB-cSps> (14 mins)

Discusses intermittency and the challenge of integrating energy storage into the electrical grid.

- **“Can 100% renewable energy power the world?”** TedED. <https://www.youtube.com/watch?v=RnvCbquYeIM> (6 mins)

Good video talks about a clean energy transition in terms of the energy services that people use. Talks about efficiency, infrastructure, fossil fuels, storage etc.

- **“The Problems with Renewable energy, and why renewables can’t save the planet”** – TedX. <https://www.youtube.com/watch?v=N-yALPEpV4w> (18 mins)

Interesting (and provocative) video about the practical and environmental issues with renewables.

Week 8

Focus on AFRICA

Tuesday February 20: Rose Mutiso: Research Director, Energy for Growth Hub
<https://energyforgrowth.org/team/rose-mutiso/>

- Mutiso, Rose, 2022, Net-zero plans exclude Africa, Nature, World View <https://www.nature.com/articles/d41586-022-03475-0>Links to an external site.
- Watch: Acceptance Speech form McGuire Prize: <https://energyforgrowth.org/article/rose-mutiso-mcguire-prize-acceptance-speech-reframing-the-debate-on-africas-energy-future/#:~:text=Hub%20Research%20Director%20Rose%20Mutiso,gender%20equity%2C%20and%20international%20development>Links to an external site..
- Rose Mutiso: The Energy Africa needs to develop (6 mins)<https://www.youtube.com/watch?v=-Hmn5Gmn2dw>Links to an external site.

Video: Saurabh Biswas, ASU, Understanding the Energy-Poverty Nexus, <https://www.youtube.com/watch?v=ofEfcRThWVg>

- UNDP, Energy Poverty: How to make modern energy access universal?, Excerpt, WEO 2015, https://www.undp.org/content/undp/en/home/librarypage/environment-energy/sustainable_energy/energy_poverty_howtomakemodernenergyaccessuniversal.html

Tuesday February 22: Energy in Developing Countries: South AFRICA

Guest Speaker: Mothibi Penn-Kekana

- Video: Rose Mutiso's TED talk: https://www.ted.com/speakers/rose_m_mutiso
- Practical Action, 2011 Energy Poverty the Hidden Crisis
- Video: Hans Rosling on Health and Wealth and Development, www.youtube.com/watch?v=meR5Z1UAswY
- "How to bring affordable, sustainable electricity to Africa" – <https://www.youtube.com/watch?v=77HUdJ7Tij0> - Ted Talks (13 mins)

1) Seizing Africa's Energy and Climate Opportunities - Africa Progress Panel 2015 (26 pages)

[Africa Progress Report 2015.pdf](#) Download Africa Progress Report 2015.pdf

2) FT: The Pieces missing in Africa's power puzzle (6 pages)

[Africa's power puzzle _ FT.pdf](#)Download Africa's power puzzle _ FT.pdf

3) Harding, 2023, South Africa load-shedding: The roots of Eskom's power problem <https://www.bbc.com/news/world-africa-65671718>

4) Africa-EU summit: Neo-colonialism or justice? (4 pages)

[Africa-EU summit _ justice.pdf](#)Download Africa-EU summit _ justice.pdf

Additional (Optional):

- Bloomberg Green: How Power is Finally Coming to Rural Africa (9 mins)

<https://www.youtube.com/watch?v=gup-cgPelzw>Links to an external site.

- **“Why solar power is spreading so fast in Africa” – The economist.**
<https://www.youtube.com/watch?v=tkvbZ0ADmz0> (5 mins)

Explains how the poor electrical grids in Africa has led the growth in off-grid solar.

- **On the Front line of Nigeria's Energy Crisis” – BBC documentary (5 mins)**
<https://www.youtube.com/watch?v=wUmIFuNNxgc>

Optional:

- Watch this video on a lighting project in the Philippines,
<http://www.bbc.co.uk/news/world-asia-pacific-14967535>

Week 9

Tuesday February 27 and 28 (x-hour): Student Presentations

NOTE: No class Feb 29

Week 10

Tuesday March 5: Course wrap up and evaluations