

**Course Syllabus**  
**ver. 4.3 – September 16, 2021**

**ISEN 401 *History and Politics of Resource Innovation***  
Fall 2021

**Northwestern University**

**Instructors:**

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**Guest Lecturers: TBD**

**Office Hours:** By appointment

**Class Assistant:** Bennett Peterson – [bennett.peterson@u.northwestern.edu](mailto:bennett.peterson@u.northwestern.edu)

**Classroom:** Tech L251

**Class Timing:** Mondays and Wednesdays: 9:30 a.m. to 10:50 a.m. CT; September 22 – December 1, 2021; Finals run December 6-11, 2021

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**Course Synopsis:** This course will chart the development of primary energy sources throughout US history and consider the impact of current political and economic decisions around energy on the development of domestic infrastructure and institutions in the near future. Content will also include policy and politics surrounding water and transportation issues that affect the energy sector.

**Course Goals:** Students should be able to:

- Understand and differentiate technological, economic, and political drivers of energy transitions in modern US history;
- Identify current drivers that will have substantial impact on domestic resource choice, including the growing impact of climate change on decision-making trends; and
- To a more limited extent, consider these topics from an international perspective.

**Prerequisites:** None

**Grading/Assessment:**

Grading will be based 20% on class participation, 50% on two papers, and 30% on a group presentation. Class participation will include ownership and mastery of discussion topics, as well as advocating competing viewpoints. Students will be expected to contribute meaningfully in a highly interactive classroom environment.

All questions and problems regarding grades must be presented in writing within one week after the test, homework, or project has been returned. The grading scale is fixed; please do not wait until the end of the quarter if you are concerned about the direction of your grade. Grades will be assigned based on all the work you have completed during the quarter using the following scale:

<b>A</b>	93.333 to 100	<b>C</b>	73.333 to 76.666
<b>A-</b>	90.000 to 93.333	<b>C-</b>	70.000 to 73.333
<b>B+</b>	86.666 to 90.000	<b>D+</b>	66.666 to 70.000
<b>B</b>	83.333 to 86.666	<b>D</b>	63.333 to 66.666
<b>B-</b>	80.000 to 83.333	<b>D-</b>	60.000 to 63.333
<b>C+</b>	76.666 to 80.000	<b>F</b>	< 60.000

**Course Readings:**

This course carries a **heavy reading load to provide ample background** for class discussion of historical trends and drivers in resource use. Weekly discussions will draw on selected materials excerpted from the following texts, reports, and primers:

- (Primary Text) Michael Webber, “Power Trip: The Story of Energy” (Basic Books, 2019)  
Students are also encouraged to follow Michael Webber’s *Today in Energy History* (@EnergyHistory) Twitter handle for daily archival facts about US Energy history
- Daniel Yergin, “The New Map – Energy, Climate, and the Clash of Nations” (Penguin Press, 2020)
- Vaclav Smil, “Energy and Civilization: A History” (MIT Press, 2017)

***Supplemental Reading List (students should NOT purchase these books at this time; they may or may not be used depending on how the class progresses)***

- Steven Solomon, “Water: The Epic Struggle for Wealth, Power, and Civilization” (Harper Perennial, 2012)
- David Nye, “Consuming Power, A Social History of American Energies” (MIT Press, 1998)
- 21st Century US Water Policy, Chapter 1: Water of the U.S.
- Small and Verhoef, “The Economics of Urban Transportation” (Routledge Press, 2007)
- Articles and Journals as assigned for specific topics

**CLASS OUTLINE**

**Week 1 ( 9/22 and 9/27): Early-industrialization and the advent of electrification**

Description/Topics: [split MSL/MJP]

- Class orientation, quarter overview, introductions
- The steam engine
- Municipal lighting
- From (literal) horsepower to electrification of mass transit (streetcar)
- Reversal of the Chicago River

Reading to be completed before class:

Power Trip (Prologue, Chapt. 1 and Chapt 3)

**Week 2 (9/29 and 10/4): The rise of petroleum: the internal combustion engine and American sprawl**

Description/Topics: [MSL lead]

- The Ford Model T (1908), affordable mass production and demand for gasoline; fueling infrastructure
- Federal Aid Road Act (1916) and the Federal-Aid Highway Act (1925)
- Rise of buses as public mass transit
- The Great Depression, PWA (Hoover, Grand Coulee and WPA (TVA)) – Rural electrification, road construction
- National Interstate and Defense Highways Act (1956) and the development of the Interstate Highway System; car culture (petroleum becomes most used fuel in US in 1950)
- Suburbanization and links to expanded energy infrastructure (natural gas pipeline and fueling infrastructure), VMT, land use, and residential energy consumption

Guest Speakers:

- Professor Michael Webber (author of *Power Trip*) confirmed for 9/29

**Week 3 (10/6 and 10/11): WWII and the birth of the nuclear age**

Description/Topics: [MJP lead]

- Manhattan Project (1942)
- Atomic Energy Act (1946) explores peaceful uses of nuclear materials
- EBR-1 (1951) and USS Nautilus - first nuclear-powered submarine (1953)
- Shippingport Atomic Power Station (1958) – first commercial nuclear power plant in US
- NRC established as regulatory body, replacing the AEC (1974). DOE absorbs R&D

**Paper #1**

**Week 4 (10/13 and 10/18): The 1960s and 1970s: – Early environmental consciousness and the Arab Oil Embargo**

Description/Topics: [MSL lead]

- Clean Air Act (1963)
- National Environmental Policy Act (1969)
- First Earth Day (1970)
- Clean Water Act (1972)
- OPEC founded (1960)
- Arab Oil Embargo (1973)

**Week 5 (10/20 and 10/25): The 1970s and 1980s: -- Domestic energy security and the fall of nuclear power production**

Description/Topics: [MJP lead]

- Domestic response to the Oil Embargo:
  - Energy Policy and Conservation Act (1975) - including creation of the SPR, CAFE standards, energy efficiency standards, and crude oil export ban
  - Rise of interest in nuclear power (41 reactors ordered in 1973)
  - Department of Energy Organization Act (1977)
- Peak domestic oil production [MSL]
- Three-mile Island (1979) and Chernobyl (1986) and impact on the growth of civilian nuclear power, anti-nuclear sentiment
- Great Lakes Charter (1985)

**Week 6 (10/27 and 11/1): Kyoto, early climate considerations**

Description/Topics: [MJP lead]

- Exxon Valdez (1989)
- Clean Air Act Amendments (1990)
- UNFCCC creation (1992), beginning of annual COP negotiations; Kyoto Protocol (1997); Paris Accord
- IPCC created (1988); 2<sup>nd</sup> assessment (1995) asserts "a discernible human influence" on the Earth's climate; 4<sup>th</sup> assessment ("very high confidence")
- Hockey Stick graph (1999) and an Inconvenient Truth (2006)
- FutureGen and the promise of CCS (2003)
- <https://mitsloan.mit.edu/LearningEdge/simulations/worldclimate/Pages/default.aspx>

**Paper #2**

**Week 7 (11/3 and 11/8): Hydraulic fracturing and the rise of a domestic energy superpower**

Description/Topics: [MSL lead]

- Mid-90s combination of fracking + horizontal drilling makes shales economical
- 2010 Deepwater Horizon and 2011 Fukushima

- Crude oil / LNG export ban lifted as part of spending omnibus (2015)

**Week 8 (11/10 and 11/15): A cleaner future?**

Description/Topics: [MJP lead]

- American Recovery and Reinvestment Act (2009) – direct investment, R&D, and LPO
- Growth of climate activism (divestment, climate marches, etc.)
- Keystone Pipeline rejected (2015), Clean Power Plan proposed (2015)
- COP21 (2015): Mission Innovation + Paris Agreement, US intent to withdraw (2017)
- Record cost declines for commercial solar/wind
- Collapse of the domestic coal industry / utilization
- Abandonment of two SC nuclear plant constructions

**Week 9 (11/17 and 11/22): Future outlook**

Description/Topics: [MJP lead]

- Impact of smart electrification and storage on our energy needs
- “Freedom molecules” and energy as an ongoing national security and diplomacy priority (LNG, Keystone/Dakota Access Pipelines, etc.)
- Domestic and international climate politics and their impact on our generation sources, including economic support for aging nuclear fleet
- Will water and transportation become more substantial resource drivers looking forward?
- What will the politicization of climate change mean for the rise of renewables?

**Week 10 (11/24 and 11/29 – note Thanksgiving is 11/25...): Review/Q&A**

**Week 11 (12/1 and week of 12/6)**

**Final Group Presentations**

Description/Topics:

*Students will select a current topic in US resource policy for presentation, framing historical drivers and considering future impacts on social, political, and domestic economic institutions.*

*Example topics:*

- *The role of abundant domestic natural gas in framing US climate positions*
- *How autonomous vehicles will redefine America’s “car culture”*
- *How can the US government most effectively incentivize the rapid deployment of domestic renewable energy?*
- *Should there be a federal energy policy, or is it best left to state innovation?*

### **COVID-19 Classroom Expectations Statement**

Students, faculty, and staff must comply with University expectations regarding appropriate classroom behavior, including those outlined below and in the [COVID-19 Code of Conduct](#). With respect to classroom procedures, this includes:

- Policies regarding masking and social distancing evolve as the public health situation changes. Students are responsible for understanding and complying with current masking, testing, Symptom Tracking, and social distancing requirements.
- In some classes, masking and/or social distancing may be required as a result of an Americans with Disabilities Act (ADA) accommodation for the instructor or a student in the class even when not generally required on campus. In such cases, the instructor will notify the class.
- No food is allowed inside classrooms. Drinks are permitted, but please keep your face covering on and use a straw.
- Faculty may assign seats in some classes to help facilitate contact tracing in the event that a student tests positive for COVID-19. Students must sit in their assigned seats.

If a student fails to comply with the [COVID-19 Code of Conduct](#) or other University expectations related to COVID-19, the instructor may ask the student to leave the class. The instructor is asked to report the incident to the Office of Community Standards for additional follow-up.

### **Class Recording**

This class or portions of this class will be recorded by the instructor for educational purpose and available to the class during the quarter. Your instructor will communicate how you can access the recordings. Portions of the course that contain images, questions or commentary/discussion by students will be edited out of any recordings that are saved beyond the current term.

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact [AccessibleNU](#). Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's [Copyright Policy](#), faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display,

or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

### **Expectations for Class Participation**

Being prepared for class is about more than just showing up, it's also about making sure you've completed the readings, homework, etc. so that you are able to make thoughtful contributions during class. Sitting silently and/or being unprepared can damage your participation grade. When in a virtual class, we expect students to keep their camera and mute on as much as possible. When in the classroom, we expect students to keep their phones off and put away.

### **Academic Integrity**

Academic integrity is taken very seriously at Northwestern. Students are responsible for reading and understanding Northwestern's Academic Integrity policies. All suspected violations will be reported to the McCormick College of Engineering's Dean's Office. These include cheating, plagiarism, fabrication, unfair advantage, unauthorized collaboration, and aiding and abetting of academic dishonesty. Students found in violation of academic integrity may receive a zero on the assignment or a failing grade for the course and may be suspended or permanently expelled from the University. See [Academic Integrity: A Basic Guide](#) for more information.

### **The Writing Place**

When working on writing assignments for this class, I encourage you to visit the Writing Place, Northwestern's peer writing center. You will work with juniors and seniors who have been trained to provide you feedback and assistance on any type of writing at any stage in the writing process. They will not edit your work. Rather, they will work with you to brainstorm ideas, organize or outline an essay, clarify your argument, document your sources correctly, or refine grammar and style.

### **Accessibility Statement**

Northwestern University is committed to providing the most accessible learning environment as possible for students with disabilities. Should you anticipate or experience disability-related barriers in the academic setting, please contact AccessibleNU to move forward with the university's established accommodation process (e: [accessiblenu@northwestern.edu](mailto:accessiblenu@northwestern.edu); p: 847-467-5530). If you already have established accommodations with AccessibleNU, please let me know as soon as possible, preferably

within the first two weeks of the term, so we can work together to implement your disability accommodations. Disability information, including academic accommodations, is confidential under the Family Educational Rights and Privacy Act.

### **Illness and Medical Leave of Absence**

Review the University's [policy](#) on missing academic work due to illness. Your instructor cannot waive an assignment missed due to illness unless the illness can be verified (e.g., by University Health Services or other licensed health professionals).

### **Discrimination and Sexual Harassment**

Northwestern's Policies on Discrimination, Harassment, and Sexual Harassment apply to all members of the University community, including students, staff, faculty, and third parties. Any student, staff, faculty member, or third party who believes that they have been discriminated against or harassed on the basis of their race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, pregnancy, parental status, marital status, age, disability, citizenship, veteran status, genetic information or any other classification protected by law, should contact the Office of Equity at (847) 467- 6571. Additional information about the University's discrimination and harassment policies, including the campus resources available to assist individuals with discrimination or harassment concerns, is available online on the [Office of Equity Website](#). Students, staff, and faculty who report harassment, discrimination, or sexual misconduct are also protected under the [University's Policy on Non-Retaliation](#).

### **Sexual Misconduct and Reporting**

Northwestern University is committed to fostering an environment where students are safe and free from sexual misconduct. [Confidential resources](#) are available to those who have experienced sexual misconduct. Faculty and instructors are not confidential resources and are required to report incidents of sexual misconduct, whether discussed in your assignments or in person, to the Office of Equity, which can provide information about resources and options. We encourage students who have experienced sexual misconduct to talk with someone to get support. For more information, including how to request interim protective measures and academic accommodations or file a complaint, see the [Get Help page](#).

### **Other Resources**

Students can find useful resources for safety and security, academic support, and mental and physical health and well-being at the [NUhelp website](#).