



**Course Syllabus – DRAFT**  
**ver. 2.2 – March 2020**

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

Fall 2020

**DAY(S) OF WEEK / HOURS**

**Northwestern University**

**Instructors: TBD – possible target instructors include:**

- Wil Burns, Professor of Research/Co-Director, Institute for Carbon Removal Law & Policy, American University; <https://www.linkedin.com/in/drburns/>

**Guest Lecturers: TBD – possible target instructors include:**

**Office Hours:** By appointment

**Class Assistant:** Name, def@xyz.com (if enrollment is sufficient)

**Class Room:** ###

**Class Timing:** TBC Evenings from 6pm to 9pm

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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.

**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

**Prerequisites:** none

**Grading/Assessment:**

Grading will be based 10% on class participation, 50% on two exams, and 40% on a final paper and presentation. Class participation will include ownership and mastery of discussion topics.

All questions and problems regarding grades must be presented in writing within one week after the test, homework, or project has been returned. Grades will be assigned based on all the work you have



completed during the semester following the traditional practice of A=90-100, B=80-89, C=70-79, D=60-69, F<60.

### **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 materials for the below texts, reports, and primers:

- Vaclav Smil, “Energy and Civilization: A History” (MIT Press, 2017)
- Daniel Yergin, “The Prize: The Epic Quest for Oil, Money, and Power” (Free Press, 2008)
- Daniel Yergin, “The Quest: Energy, Security, and the Remaking of the Modern World” (Penguin Books, 2012)
- Small and Verhoef, “The Economics of Urban Transportation” (Routledge Press, 2007)

### *Supplemental Reading List*

- Steven Solomon, “Water: The Epic Struggle for Wealth, Power, and Civilization” (Harper Perennial, 2012)
- 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.
- 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.

**CLASS OUTLINE****Week 1 (Date): Early-industrialization and the advent of electrification**Description/Topics:

- The steam engine
- Municipal lighting
- From (literal) horsepower to electrification of mass transit (streetcar)
- Reversal of the Chicago river

**Week 2 (Date): The rise of petroleum: the internal combustion engine and American sprawl**Description/Topics:

- 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

Potential Guest Speakers:

- Henry Binford, Associate Professor, History

**Week 3 (Date): WWII and the birth of the nuclear age**Description/Topics:

- 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

**Exam #1**

**Week 4 (Date): The 1960s and 1970s: – Early environmental consciousness and the Arab Oil Embargo**Description/Topics:

- Clear 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 (Date): The 1970s and 1980s: -- Domestic energy security and the fall of nuclear**Description/Topics:

- 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
- 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 (Date): Kyoto, early climate considerations**Description/Topics:

- Exxon Valdez (1989)
- Clean Air Act Amendments (1990)
- UNFCCC creation (1992), beginning of annual COP negotiations; Kyoto Protocol (1997)
- 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>

**Exam #2****Week 7 (Date): Hydraulic fracturing and the rise of a domestic energy superpower**Description/Topics:

- 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 (Date): A cleaner future?**Description/Topics:

- 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 (Date): Future outlook**Description/Topics:

- 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 (Date): Class final 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?*

**Final Presentation / Paper Due**