

History of Energy Resources and Utilization

| HIST 186 | SUST 186 | Spring 2024 | Mon & Wed 1815-1930 | Meliora 221 |
| Instructor: Morris A. Pierce, PhD | m.pierce@rochester.edu | Office hours Mon & Wed 1630-1730 RRL 401 |

This course will explore the many types of energy resources that have been used to provide heat, light, and power for residential, commercial, industrial, and transportation uses, along the various means by which they were converted to productive end uses. The major energy resources in the ancient world were muscle power and renewables (wind, solar, wood), and these changed very little until the end of the 18th Century when coal came into widespread use. In the late 19th Century petroleum began its rise to become the most widely used energy resource, with natural gas and nuclear energy securing significant market share in the 20th Century. Despite widespread recognition of the environmental consequences of widespread use of fossil fuels, the transition back to renewable resources continues at a very slow pace. This course will explore the history of these various energy resources and how they were utilized, wasted, and conserved, giving students an opportunity to use solid historical evidence to envision a successful and sustainable energy future.

Required Coursework and Grading

- Class attendance is not required but is appreciated.
- **Three papers are required** – Worth 100 points total. Papers to be double-spaced and include reference citations as appropriate using any format style you are comfortable with. E-mail me a PDF of your paper by the end of class on the due date or 10 am for paper #3 due on Sunday May 12th, late papers will lose points. For each paper you may choose any relevant energy topic that you are interested in, including those that you know something about but want to learn more and others that you are not familiar with but want to learn about. Papers longer than the suggested length are also fine if you need more space for your topic. Feel free to include pictures, charts and graphs if they are helpful. If you prefer, another media such as video or powerpoint may be used, let me know if you plan to do this to insure that it will meet the requirements.
- **Paper #1: Due February 19th (30 points)** 4–5 pages paper
- **Paper #2: Due April 29th (last day of class) (30 points)** 4–5 pages
- **Paper #3: Due Sunday, May 12th by 10:00 am (40 points)** 8-10 pages
- **As an option to the above individual papers**, you can choose to research and write one or more longer papers on a relevant topic in place of two or more of the smaller papers. Send me a detailed proposal well ahead of the due date for the replaced paper. A paper to replace all three individual papers, for instance, would be roughly 15-20 pages in length and include in-depth research, analysis, and conclusions.
- **Topics:** This list is not comprehensive but will provide some guidance on potential topics
 - **Energy Sources:** Muscles, solar, wind, water, biomass, geothermal, coal, petroleum, natural gas, nuclear; drilling, mining, etc.
 - **Energy Markets:** Pipelines, railroads, trucks, ships, muscles; futures markets, traders, wholesale and retail distribution; refineries, storage tanks, liquified natural gas, compressed natural gas, etc.; wars, sanctions, etc.
 - **End User Energy:** Gasoline, diesel, electricity, steam, hot water, whale oil, camphene, compressed air
 - **Energy Technology:** Heating, cooling, lighting, external combustion engines, internal combustion engines, transformers, electric motors, cooling towers, surface water cooling, cogeneration, district heating
 - **Energy Storage:** Batteries, springs, flywheels, pumped storage, molten salts, seasonal storage
 - **Supply Interruptions:** Deforestation, strikes, accidents, embargos, weather, etc.
 - **End uses:** Automobiles, airplanes, street lighting, building lighting, flashlights
 - **Lighting:** Torches, candles, lamps, incandescent bulbs, arc lights, lime lights, fluorescent bulbs, halogen, neon, light emitting diodes (LEDs)
 - **Emissions:** Carbon dioxide, mercury, lead, oxides of sulphur and nitrogen, visible smoke; global warming, smog, acid rain, lead poisoning
 - **Timeline and Geography:** Energy utilization over time and space
- **Assignment grades** will be posted on Blackboard. The course grade will be based on the total number of points earned in the course, with letter grades assigned according to the following scale:

95-100	A
91-94	A-
88-90	B+

85-87	B
82-84	B-
80-81	C+

78-80	C
75-77	C-
73-74	D+

70-72	D
68-69	D-
0-67	E

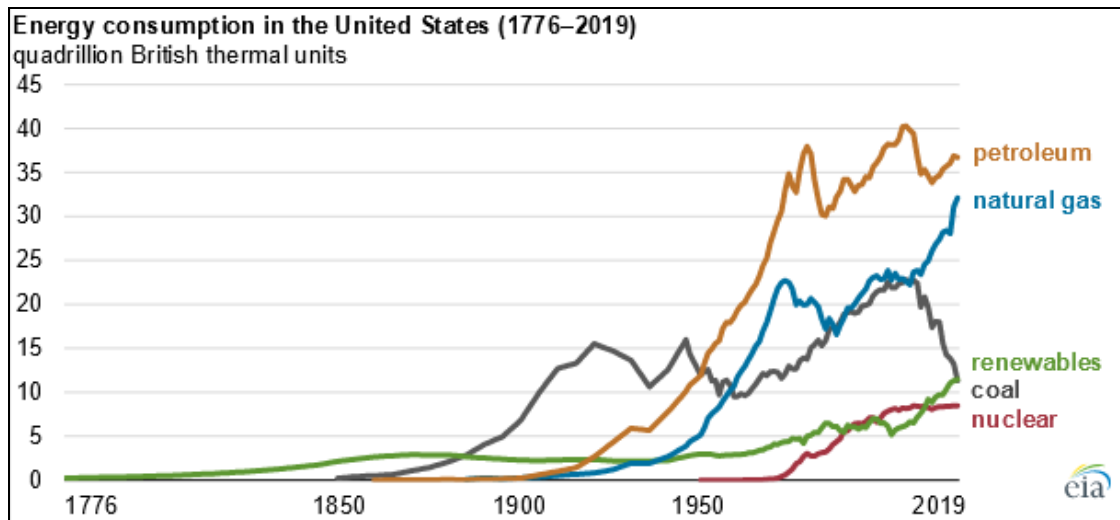
Texts and Resources

Lecture slides and links to videos and other course materials will be posted on Blackboard.

There are no required books for the course as there are extensive materials available in print and on line. A list of resources is available on Blackboard and will be updated during the semester. Links to relevant articles will also be posted.

Course Schedule (subject to change):

1	17 January	Introduction and course objectives. What are energy resources, where do they come from, and how do they get extracted and utilized? What is the difference between primary and end-use energy. What is energy and power, and how are they measured? Quads, MTOEs, Joules, Watts, kW, kWh, etc. Overview of current energy resources used in the United States.
2	22 January	Overview of energy resources used in other parts of the world. Energy resources and utilization in ancient civilizations, particularly Greece and Rome – Muscles, Solar, Wind, Water, Biomass, Geothermal, and some Coal
3	24 January	Wood, deforestation, and energy conservation in Early Modern Europe and Colonial America
4	29 January	The Industrial Revolution in Britain and America
5	31 January	Illumination before electricity
6	5 February	Batteries and electric energy storage
7	7 February	The Steam Engine and Steam Turbine
8	12 February	The Internal Combustion Engine
9	14 February	Coal and the “Smoke Problem” in the 19 th Century (and before)
10	19 February	<i>The Prize</i> Part 1 “Our Plan” Paper #1 due
11	21 February	<i>The Prize</i> Part 2 “Empire of Oil”
12	26 February	<i>The Prize</i> Part 3 “The Black Giant”
13	28 February	<i>The Prize</i> Part 4 “War and Oil”
14	4 March	<i>The Prize</i> Part 5 “Crude Diplomacy”
15	6 March	<i>The Prize</i> Part 6 “Power to the Producers”
	9-17 March	Spring Break – No class
16	18 March	<i>The Prize</i> Part 7 “The Tinderbox”
17	20 March	<i>The Prize</i> Part 8 “The New Oil Order”
18	25 March	Gasoline
19	27 March	Thomas Edison and the widespread adoption of electricity for heat, light, and power.
20	1 April	Giant Power, Superpower and the public ownership debate; Rural electrification.
21	9 April	Networks of Power – the growth of electric power generation, transmission, and use.
22	8 April	The Five-Year Plans: Energy Planning in the Soviet Union and elsewhere
23	10 April	The “Big Inch” pipeline and the growth of the natural gas industry after World War II.
24	15 April	The promise of nuclear power: Electricity would be “too cheap to meter”
25	17 April	Public input to energy projects – Hetch Hetchy, Astoria nuclear plant in Queens, Storm King Pumped Storage Project, Glen Canyon dam, Keystone XL oil pipeline, electric transmission lines and natural gas pipelines.
26	22 April	Hydraulic fracturing and the War on Coal
27	24 April	The Green New Deal – Can renewable resources and energy efficiency provide all of our future energy needs at an affordable cost? Several options exist to decarbonize electric generation, but decarbonizing buildings, factories and transportation present significant technical and economic obstacles.
28	29 April	Potential near-term and long-term energy futures. Will batteries make a big difference? Paper #2 Due.
	12 May	Paper #3 due at 10 am on Sunday, May 12th



The College's credit hour policy on undergraduate courses is to award 4 credit hours for courses that meet for the equivalent of 2 periods of 75 minutes each week. Students enrolled in HIST 186 are expected to devote at least one hour each week to identifying the main lines of argument in course readings, working alone or in groups, and to researching in depth their topics for their papers.

Students with disabilities: The University of Rochester respects and welcomes students of all backgrounds and abilities. In the event you encounter any barrier(s) to full participation in this course due to the impact of disability, please contact the Office of Disability Resources. The access coordinators in the Office of Disability Resources can meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations. You can reach the [Office of Disability Resources](#) at: disability@rochester.edu; (585) 276-5075; Taylor Hall.

Academic honesty: All assignments and activities associated with this course must be performed in accordance with the University of Rochester's Academic Honesty Policy. Cheating and plagiarism are serious offenses and will be treated as such. Anyone who engages in such activities will be turned over to the College Board on Academic Honesty for disciplinary action, as outlined at <http://www.rochester.edu/College/honesty/>.

For a helpful discussion of plagiarism (including subtle instances), see the American Historical Association's "Defining Plagiarism," <https://www.historians.org/teaching-and-learning/teaching-resources-for-historians/plagiarism-curricular-materials-for-history-instructors/defining-plagiarism>.