

History of Energy Resources and Utilization

| HIS 186 - CRN 27657 | SUS 186 – CRN 85477 | Spring 2020 | Mon & Wed 1815-1930 | Gavett 202 |
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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

- **Four papers are required** – Each is worth 25 points, 100 points total. Papers to be double-spaced and include reference citations as appropriate (any format style can be used). Paper copies are acceptable, e-mailed PDF files are preferred but Word is ok. Papers are due by the end of class on the date due, late papers will lose points. 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: Two options: History of energy consumption in a specific place; or of a specific energy utilization (25 points)** – Due February 19 – Research and write a 3–4 page paper describing historical energy usage in a specific location (which could be a city, state, country or other geographic location) or about a specific energy utilization (some form of heat, light, or power generation or application). For instance you can explore energy resources used in your home town over the past century, how warships changed from sail to coal to oil and nuclear power, why electric cars failed in the early 20th Century marketplace, how the internal combustion engine has survived and even thrived, how a past energy crisis affected one or more communities or countries, or how technologies such as photovoltaics, wind power, and hybrid and electric cars have resulted in positive change.
- **Paper #2: Analysis of current energy use in the same or different location (25 points)** – Due April 1st – Research and write a 3–4 page paper about the option not chosen for paper #1.
- **Paper #3: Adaptation to Climate Change (25 points)** – Due April 29th. Research and write a 3–4 page paper on this topic. Many governments, institutions, and companies are studying or implementing plans to adapt to climate change, especially those near coastal waters. Some governments are also forbidding new fossil-fuel infrastructures and even connection of new buildings to existing natural gas networks. Courts in the Netherlands have recently ordered that the government drastically reduce carbon emissions, but similar attempts elsewhere have not gained traction. Other governments have imposed various taxes on carbon emissions, and New York City's recent Climate Mobilization Act will provide substantial economic incentives to reduce carbon emissions. Given the likelihood that implementation of solutions to reduce the growth of atmospheric carbon dioxide will be too little and/or too late, identify one or more of these plans and describe its components, cost, and feasibility. Feel free to express your opinion about the value of these local measures and the necessity of adaptation.
- **Paper #4: Present your view of the near and/or long-term energy future, or some portion of it (25 points)** – Due at 11:59 pm on Sunday, May 10. Research and write a 5–10 page paper presenting your views about the future of energy resources and utilization in some specific place or application. This could be an analysis of someone else's vision of an energy future, or your own. Include a discussion of near term (5 to 20 year) and/or long term (20+ years) opportunities that are either likely to happen or could happen with some political or economic intervention. This is a very broad topic but your analysis must be based on reasonable assumptions and available technologies. Topics could include weaning the University of Rochester or other institution or community off of fossil fuels, the potential for large-scale carbon sequestration, or the adoption of a hydrogen economy. Be sure to address potential criticisms of your views and any viable alternative solutions. As will be discussed in class, a fair number (and perhaps most) schemes proposed to eliminate fossil fuels in the near term (50 years) have serious shortcomings.
- **As an option to the above individual papers**, you can choose to research and write one or more longer papers on a relevant topic or topics to replace two or more of the smaller papers, send me a detailed proposal well ahead of the due date. A paper to replace all four individual papers, for instance, would be roughly 15–20 pages in length and include in-depth research, analysis, and conclusions.

- **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:

94-100	A	85-87	B	78-80	C	70-72	D
91-93	A-	82-84	B-	75-77	C-	68-69	D-
88-90	B+	80-81	C+	73-74	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:

1	15 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	27 January	Wood, deforestation, and energy conservation in Early Modern Europe and Colonial America
4	29 January	The Industrial Revolution in Britain and America
5	3 February	Illumination before electricity
6	5 February	Chemical batteries for telegraphs, etc.
7	10 February	The Steam Engine and Steam Turbine
8	12 February	The Internal Combustion Engine
9	17 February	Coal and the “Smoke Problem” in the 19 th Century (and before)
10	19 February	Drake’s folly and the petroleum industry Paper #1 due
11	24 February	<i>The Prize</i> Part 1 “Our Plan”
12	26 February	<i>The Prize</i> Part 2 “Empire of Oil”
13	2 March	<i>The Prize</i> Part 3 “The Black Giant”
14	4 March	<i>The Prize</i> Part 4 “War and Oil”
	7-15 March	Spring Break – No class
15	16 March	<i>The Prize</i> Part 5 “Crude Diplomacy”
16	18 March	<i>The Prize</i> Part 6 “Power to the Producers”
17	23 March	<i>The Prize</i> Part 7 “The Tinderbox”
18	25 March	<i>The Prize</i> Part 8 “The New Oil Order”
19	30 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. Paper #2 due
21	6 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	13 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	20 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	27 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 #3 Due.
	10 May	Paper #4 due at 11:59 pm on Sunday, May 10th

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 HIS 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>.

