

ENV362H1S L0101

Energy and Environment: Transitions in History

Winter 2022

This course will take a historical perspective on energy technologies, focusing on periods when there was significant change in the available technologies and in the organization and exploitation of energy resources. The emphasis will be on the contexts that gave rise to these changes (cultural, economic, political, environmental), as well as on the consequences of these changes for interactions within and between human communities and their environments. The transformative effects of the adoption of fossil fuel technologies in the nineteenth and twentieth centuries will be given due prominence, but attention will also be paid to longer-term issues of food and fuel production and processing, and to changes in transport and storage. The chronological scope of the course will therefore include the emergence of agricultural communities and the development of territorial states and empires as well as more recent developments.

Class time and location: Thursdays, 12 noon – 2pm ES B142

Tutorials: T0101: Thursdays 2pm -3pm NF004

 T0201: Tuesdays 1pm – 2 pm NF004

At the end of this course, students should be able to:

- **Show understanding** of energy transitions in history.
- **explain** how changes in energy technologies led to changes in past human societies and their environments, and what factors affected the adoption and use of new energy technologies.
- **compare** the effects of energy transitions in different social contexts
- **reflect** on the possible implications for Canadians of the current energy transitions.

Instructor: Ben Akrigg (Classics)

Office: Room LI117, 125 Queens Park

email: ben.akrigg@utoronto.ca I shall do my best, but cannot promise, to answer email enquiries within 24 hours. I shall not answer email enquiries over the weekend, however.

Office hours: Mondays and Wednesdays 12 noon to 1 pm (If these times are impossible for you, please email me to arrange an appointment at a different time.)

Course Assessment: Mid-term test	30%
Final Assessment	40%
Short research paper (due 5 th April)	20%
Participation	15%
Short weekly assignments	15%

Some further notes on course requirements:

- **Readings.** See below for a schedule. The required readings will be provided on Quercus.
- **Tutorials.**
 - Attendance at tutorials is required. There will be three possible marks for participation in each tutorial: 10 (present and contributes effectively to discussion, and/or participates fully in other tutorial activities); 7 (present, but does not contribute effectively to discussion, or take full part in activities); and 0 (absent).
 - Each tutorial will have a short written assignment to be completed in advance and **handed in on paper at the start of the week's lecture class.** Details of each assignment will be provided in class a week in advance (so we will talk about the first assignment in the first lecture class), but typically you will be asked to write about 200 words/half a page in response to an aspect of that week's readings (see schedule below). There will be three possible marks for tutorial assignments. If your response shows evidence of careful reading of the set text(s) and organized thought about it, you will receive full credit (10). If you hand in something, but it is clearly half-hearted and put together in a rush, you will get half-credit (5). Obviously if you fail to hand anything in you will get no credit (0).
 - **Note that there will be no tutorials in the first week of term (14th January).**
- There will be one mid-term **test**, which will be held on Thursday 17th February.

- The test will cover the material from the preceding five weeks of the course, including assigned readings and class slides and handouts, and will require both short answers and a small number of longer answers (similar in length and scope to the tutorial assignments).
- Students who miss the test will receive a mark of zero for the test.
 - However, if the test was missed for reasons entirely beyond your control you should, within one week of the test, submit to the instructor a written request for special consideration explaining your reason for missing the test. If your reason for missing the test is acceptable, then you will be able to take a make-up test.
- **Final exams** are scheduled by the Faculty of Arts and Science. The exam period for this semester runs from 11th to 29th April. The exam timetable will be published in February.
 - The final exam will include both short-answer sections similar to the in-class tests and a longer-answer “essay” section.
- The **research paper** will be about 2000 words long. Some of the tutorial sessions will be devoted to helping you with this.
 - You may submit your paper via Quercus, or in person in the last lecture class.
 - Late submissions will receive a mark of zero.
 - Further information will be provided separately

Class & reading schedule:

Week 1 13th January Introduction: The Scope of the Course

Note: No tutorials this week.

Reading: Ian Morris, *Foragers, Farmers and Fossil Fuels: How Human Values Evolve*. (Princeton 2015). Chapter 5: ‘The Evolution of Values: Biology, Culture and the Shape of Things to Come’, pages 139-171

Week 2 20th January The Current Energy Transition

Reading: Vaclav Smil, *Energy Transitions: Global and National Perspectives* (second ed. Santa Barbara 2017). Chapter 2: ‘Energy Transitions: Universal Patterns’, pages 23-93.

Week 3 27th January Transition to Agriculture

Reading: Graeme Barker, *The Agricultural Revolution in Prehistory: Why did Foragers become Farmers?* (Oxford 2006). Chapter 10: ‘The Agricultural Revolution in Prehistory: Why did Foragers become Farmers?’ pages 382-414 **and**

James C. Scott *Against the Grain: A Deep History of the Earliest States* (New Haven 2017). Chapter 4, ‘Agro-ecology of the Early State’, pages 116-149.

Week 4 3rd February Constraints in pre-industrial agriculture

Reading: Vaclav Smil, *Energy and Civilization: A History* (Cambridge, MA 2017), chapter 3 ‘Traditional Farming’, pages 49-126.

Week 5 10th February Energy in ancient empires

Reading: John Peter Oleson ed. *The Oxford Handbook of Engineering and Technology in the Classical World* (Oxford 2008), chapter 6 ‘Sources of Energy and Exploitation of Power’ by Örjan Wikander, pages 136-157 **and**

Arlene Miller Rosen, *Civilizing Climate: Social Responses to Climate Change in the Ancient Near East* (Lanham, MD 2007), chapter 8: ‘Empires in the Desert: Political Ecology of Ancient Empires’, pages 150-171.

Week 6 17th February MIDTERM

No readings or tutorials this week.

READING WEEK is February 21st to 25th

Week 7 3rd March First Globalization?

Reading: Robert B. Marks *The Origins of the Modern World: A Global and Environmental Narrative from the Fifteenth to the Twenty-First Century* (Lanham MD 2015), chapter 3: ‘Empires, States and the New World, 1500-1775’, pages 67-96

Week 8 10th March Industrial Revolution I: The difference a steam engine makes...

Reading: Bob Everett, Godfrey Boyle, Stephen Peake and Janet Ramage eds, *Energy Systems and Sustainability: Power for a Sustainable Future* (2nd ed, Oxford 2012), chapter 6 ‘Heat to Motive Power’ by Janet Ramage, pages 179-211

Week 9 17th March Industrial Revolution II: ... but agriculture still matters

Reading: Robert C. Allen, *The British Industrial Revolution in Global Perspective* (Cambridge 2009), chapter 3 ‘The Agricultural Revolution’, pages 57-79 **and** E A Wrigley, *Energy and the English Industrial Revolution* (Cambridge 2010), chapter 3 ‘Agricultural change and urbanisation’, pages 55-90.

(Note that Sunday 14th March is the last day to cancel S courses without academic penalty)

Week 10 24th March Industrial Revolution III: Regional variations: the uneven distribution of the future

Reading: Christopher F. Jones, *Routes of Power: Energy and Modern America* (Cambridge, MA 2014). Chapter 2: ‘The Anthracite Energy Transition’, pages 59-87

Week 11 31st March Oil

Reading: Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London 2011). Chapter 1: ‘Machines of Democracy’, pages 12-42

Week 12 7th April The Current Energy Transition Revisited: where next?

No readings for this week.

8th April: Written assignments due.

(Examination Period begins Monday 11th April, runs to Friday 29th April).

Finally, information on some important issues, in no particular order:

Specific Medical Circumstances

For the 2022 S (“Second”, winter) semester, a Verification of Illness (also known as a "doctor's note") is temporarily not required. Students who are absent from academic participation for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration. The declaration is available on ACORN under the Profile and Settings menu. Students should also advise their instructor of their absence.

If an absence extends beyond 14 consecutive days, or if you have a non-medical personal situation preventing you from completing your academic work, you should contact your College Registrar. They can provide advice and assistance reaching out to instructors on your behalf. If

you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible.

Academic Integrity

All students, faculty and staff are expected to follow the University's guidelines and policies on academic integrity. For students, this means following the standards of academic honesty when writing assignments, collaborating with fellow students, and writing tests and exams. Ensure that the work you submit for grading represents your own honest efforts. Plagiarism—representing someone else's work as your own or submitting work that you have previously submitted for marks in another class or program—is a serious offence that can result in sanctions. Do not hesitate to speak to me or your TA for advice on anything that you find unclear. To learn more about how to cite and use source material appropriately and for other writing support, please see the U of T writing support website at <http://www.writing.utoronto.ca>. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see <https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity> and <http://academicintegrity.utoronto.ca>

Religious Accommodations

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. I shall make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. Further to University Policy, if you anticipate being absent from class or missing a major course activity (such as a test or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

Students with Disabilities or Accommodation Requirements

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) by visiting <http://www.studentlife.utoronto.ca/as/new-registration> . Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

Accommodation for Personal Reasons

There may be times when you are unable to complete course work on time due to non-medical reasons. If you have concerns, speak to me or to an advisor in your College Registrar's office; they can help you to decide if you want to request an extension or accommodation. They may be able to provide you with a College Registrar's letter of support to give to your instructors, and importantly, connect you with other resources on campus for help with your situation.

Quercus Info

This course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. Once you have logged in to Quercus using your UTORid and password, you should see the link or "card" for ENV362H1S Energy & Environment: Transitions in History. You may need to scroll through other cards to find this. Click on the ENV362H1S link to open our course area, view the latest announcements and access your course resources. There are Quercus help guides for students that you can access by clicking on the "?" icon in the left side column. SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

Lecture Capture by Instructor

Where lecture recordings are provided, they are only for the exclusive use of enrolled students, for their personal learning. Lecture recordings are not to be shared in any way beyond enrolled students.

Privacy/FIPPA Statement

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971 and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one's work to the group. For more information, please refer to <http://www.utoronto.ca/privacy>.

Mental Health and Well-being

As a student, you may experience challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation, financial concerns, family worries and so forth. These factors may affect your academic performance and/or reduce your ability to participate fully in daily activities. Everyone feels stressed now and then – it is a normal part of university life. Some days are better than others, and there is no wrong time to reach out. There are resources for every situation and every level of stress.

There are many helpful resources available through your College Registrar or through Student Life (<http://studentlife.utoronto.ca> and <http://www.studentlife.utoronto.ca/feeling-distressed>). An important part of the University experience is learning how and when to ask for help. Please take the time to inform yourself of available resources.

Course Materials, including lecture notes

Course materials are provided for the exclusive use of enrolled students. Do not share them with others. I do not want to discover that a student has put any of my materials into the public domain, has sold my materials, or has given my materials to a person or company that is using them to earn money. The University will support me in asserting and pursuing my rights, and my copyrights, in such matters.

Equity, Diversity and Inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

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Research Essay Assignment

Choose a specific past energy transition (which could be a fuel substitution, a prime mover substitution, the domestication of a particular plant species or similar) and discuss the circumstances in which that transition took place, the length of time it took to take place, and the consequences for people affected by it.

Word limit: 2000 words, including notes but not including the bibliography. (This limit is not completely arbitrary: it is approximately the length of a paper presentation at a major conference).

Submission deadline: Friday 8th April, 5pm. This is the last day of regularly-scheduled classes; this assignment should not intrude into the exam period. However, if you anticipate that you will have difficulty meeting this deadline then I will be happy to grant you an extension (length to be agreed between us) without penalty if you contact me at least 24 hours before this deadline.

You may submit your paper via Quercus, by email or in person in the last lecture class (on Thursday 7th April).

References: You should provide references for any factual claims you make.

Use any referencing system with which you are familiar; just make sure that you apply it consistently.

How many references you need will depend on your individual case, but for a piece this length I'd expect to see roughly between ten and twenty.

Grading: Grades will be assigned on the content of your piece. As long as your points are clear and understandable, you will not be penalised for errors of spelling or grammar.

The best papers will engage with all three of the aspects of your energy transition that I have asked about: the circumstances, the length of time it took; and the consequences. Note that you will not necessarily need to spend a lot of your words on describing the details of the technology/species/fuel you are talking about, unless these are directly relevant to another aspect of your essay. The context and the consequences are what you should focus on.

Try to write in a way that would be accessible for other (advanced) undergraduate students like yourself. Think about readings that you have found clear and helpful and try to emulate them.