

San José State University
Environmental Studies Department
Energy & the Environment ENV5/ENGR 119-01
Spring 2025

Course and Contact Information

Instructor:	Benoit Delaveau, M.S, CEM, BEAP
Office Location:	(see Calendly below)
Email:	Use Canvas messaging
Office Hours:	Office Hours: ALWAYS book me on: https://calendly.com/benoit-delaveau
Class Days/Time:	Tu/Th 9:00-10:15pm
Classroom:	Online Zoom (access secured to MySJSU accounts only)
Prerequisites:	Passage of the Writing Skills Test or ENGL 100A / LLD 100A with a C or better (C- not accepted), completion of Core General Education and upper division standing are prerequisites to all SJSU studies courses. Completion of, or co-registration in, 100W is strongly recommended.

GE/SJSU Studies Category: Area R: Earth & Environment <http://info.sjsu.edu/static/catalog/sjstudies.html>

MYSJSU Messaging and Canvas

Course materials such as the syllabus, assignments, readings, and handouts are posted to Canvas. You are responsible for regularly checking with the messaging system through MySJSU: <https://sjsu.instructure.com>. Log in with your SJSU One account: <https://one.sjsu.edu/> For assistance see: <http://www.sjsu.edu/at/ec/support/>

Course Description

Introduces students to the sources of energy that fuel industrial civilization and the environmental impacts of energy extraction, distribution, and consumption. Explores a range of approaches to moving society toward a more sustainable energy future. This course introduces students to patterns of energy use, and the social, technical, and environmental challenges to providing sustainable energy supplies. Students learn physical principles underlying power generation, conventional forms of energy and their social and environmental impacts, sources of renewable energy, and means to transition to more sustainable energy sources. The political, economic, cultural, historical, and policy dimensions of energy procurement, generation, and consumption show how energy issues are entangled in deeper social and environmental contexts.

Course Goals

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

- Understand the nexus of energy challenges and relevant economic, social, and environmental issues.
- Describe the physical principles related to the energy, heat, power, and work
- Complete basic calculations / conversions in energy, heat, power, and work
- Describe the scientific properties and spatial distribution of conventional and renewable energy sources
- Analyze the relative energy use in U.S. to other nations, and the forces that shift the mix of energy sources over time under Climate Change and resource scarcity pressures.
- Describe basic principles to improve efficiency and design of energy delivery, recognize opportunities to reduce energy consumption, and promote sustainability;
- Assess basic economic, government policy, and social equity dimensions of energy options
- Utilize tools to evaluate an energy option and assess alternatives.

General Education Learning Outcomes

GELO 1: Apply scientific principles and the scientific method to answer questions about earth, the environment, and sustainability while recognizing the limits of both the method and principles. SLO 1 is assessed in assignments 1, 2, & 4, and the midterm & final exam.

GELO 2: Apply mathematical or quantitative reasoning concepts to the analysis and generation of solutions to issues of earth, the environment, and sustainability. SLO 2 is assessed in assignments 1 & 2, and the midterm & final exam.

GELO 3: Communicate a scientific finding, assertion, or theory to a general audience with the integrity and rigor of the underlying science. SLO 3 is assessed in the final research paper and assignments 3 & 4, and the final paper.

GELO 4: Explain ethical, social, and civic dimensions of scientific inquiry. SLO 4 is assessed in assignments 3 & 4, and the final research paper.

Required Texts/Readings

Textbook (optional - PDFs published on Canvas): Energy for Sustainability: Technology, Planning, Policy 2nd Edition by John Randolph PhD, Gilbert M. Masters ISBN-13: 978-1597261036 ISBN-10: 1597261033 - Other Readings: Articles and handouts are all posted to Canvas.

Library Liaison

Peggy Cabrera, peggy.cabrera@sjsu.edu

Course Requirements and Assignments

Dropping and Adding: Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, ... Refer to the current semester's Catalog Policies.

Grading: Use the percentages below and your scores to monitor your grade. Real time grade will be available along the semester on Canvas.

Credit-hour statement: This three-unit course requires a minimum of 9 hours per week to complete class-related readings and assignments (roughly 2.5 hours in class and 6.5 hours outside class per week.) More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>

Academic integrity: As part of the GE program, strict enforcement of SJSU Academic integrity rules will be enforced. See the University Policy at https://ischool.sjsu.edu/sites/main/files/file-attachments/academic_integrity_policy_f15-7_0.pdf?1539701808

Online tools and conduct

Technology Requirements: Students are required to have an electronic device other than a smartphone like a laptop, desktop or tablet, with a camera and a microphone. SJSU has a free equipment loan program available for students. Students are responsible for ensuring that they have access to reliable Wi-Fi during tests. If students are unable to have reliable Wi-Fi, they must inform the instructor, as soon as possible are at the latest one week before the test date to determine an alternative. See Learn Anywhere website for current Wi-Fi options on campus.

Proctoring Software and Exams: Exams and Quizzes will be proctored in this course through Respondus Monitor and LockDown Browser. Please note it is the instructor's discretion to determine the method of proctoring. If cheating is suspected the proctored videos may be used for further inspection and may become part of the student's disciplinary record. Online Exams. All essays, Canvas discussions and short written replies are processed using the updated version of Turnitin. If cheating or the use of AI writing tools is suspected further investigation and may become part of the student's disciplinary record

Testing Environment Setup:

- No earbuds, headphones, or headsets.

The environment is free of other people besides the student taking the test.

- If students need scratch paper for the test, they should present the front and back of a blank scratch paper to the camera before the test.
- No other browser or windows besides Canvas opened., no communication with anybody is allowed.
- No communication with anybody is allowed during the entire time scheduled for the exam, even when you have finished your own submission.
- Well-lit environment. Can see the students' eyes and whole face. Avoid having backlight from a window or other light source opposite the camera.
- Personal calculators are permitted.

Students must:

- Remain in the testing environment throughout the duration of the test.
- Keep full face, hands, workspace including desk, keyboard, monitor, and scratch paper. Stay in full view of the webcam

Recording Zoom Classes: This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted after 10 days per SJSU Zoom contract. All recordings are only available to registered students in the class.

Students are not allowed to record without instructor permission: Students are prohibited from recording/taking screen captures of all class activities (including class lectures, office hours, advising sessions, etc.), are prohibited of distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

Online Classroom Protocol

- You are expected to come to every class on time.
- Only SJSU registered students are allowed in the Zoom classroom (use your MySJSU Zoom account)
- Your profile name must be the first name, family name that match SJSU record
- Camera ON is strongly recommended.
- Mic should be OFF.
- Classroom participation gives 2pts in participation grade. If you choose to not participate verbally, you can use the Canvas discussion board opened for the week and ask your question in writing.
- To participate, please use the "raise the hand" on Zoom and wait for the instructor to give you the floor.
- Inappropriate, unrespectful, offensive, slur... comments or chat entries will be sanctioned appropriately.
- No cell phone, no side playing on your computer, no emailing, or text messaging during class. If you need to be engaged in these activities, please disconnect from the Zoom session and excuse yourself. You may later on refer to the session recording to get the lecture content.

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy F15-7 requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. Visit the Student Conduct and Ethical Development website for more information.

See here for other campus wide policies <http://www.sjsu.edu/gup/syllabusinfo/>

Grading – Exams

10% weekly Quizzes (about 12 mini-exams, in class, Canvas based and proctored) Quizzes are based on key concepts from either (1) the lecture slides (2) the assigned chapter of the text book (3) the assigned readings. Quizzes takes a maximum of 10 minutes of class time, and are always proctored using a Lockdown browser, with the student camera ON during class time.

10% participation. Two individual class presentation are mandatory. One around an “energy news article” that the student choose, and one about the student Final research paper.

20% Assignments: As part of the activities in this class, you will complete three graded assignments. Late assignments are ALWAYS accepted following these penalty rules: 1 week after due date of unexcused delay -25%, 2 weeks after due date -50%.

Assignment 1 (in groups) – Unit conversions, power energy, energy/GHG (SLO 1)

Assignment 2 (in groups) – Energy and GHG problem sets (SLO 1 & 2)

Assignment 3 (individual) – Carbon footprint calculator (SLO 1, 2, & 3)

20% Midterm: Both the midterm and the final exams will be open notebook (your personal typed or handwritten notes). The exams will include short answers and essay questions. Your notebook could contain lecture notes and short annotations on the readings, but all will have to be printed out as the exam proctor software will ban access to all of your computer content. You must bring a calculator to the examinations. You will not have access to any electronic devices (other than a calculator and your Zoom locked down computer for proctor). The midterm will include material covered during the first portion of the class. We will include both multiple choice and problems related to the scientific principles of energy, heat, and work. You are encouraged to review the problems sets before the midterm.

20% Final Exam: There will be a comprehensive final exam. Same rules as Midterm exam (see above).

20% Final Research Paper: Students will individually write a research paper related to a book review related to renewable or conventional energy technologies. Each student are choosing a book of their choice from list available at the start of the semester. More details on this assignment is available on Canvas and at the bottom of this document.

Determination of Grades

The course grade will be determined based on a total 100 possible points. Accumulated points that fall within the grade scale below determine your semester grade.

A+ 97–100

A 92–96

A- 89–91

B+ 86–88

B 81–85

B- 79–80

C+ 76–78

C 72–75

C- 69–71

D+ 67–68

D 64–66

D- 60–64

F < 60

- NO Extra Credit available (given the workload to deal with in this class).

Primary sources for your Final Paper

Primary sources (choose one - most can be checked at SJSU library see list at the bottom)

Coal Energy

- “Big Coal, The Dirty Secret Behind America’s Energy Future” by Jeff Goodwell
- “Dark Money, The Hidden History of the Billionaires Behind the Rise of the Radical Right” by Jane Mayer

Nuclear Energy

- “Energy, The Making of the Atomic Bomb, a Human History” by Richard Rhodes
- “The Water Will Come, Rising Sea, Sinking Cities and the Remaining of the Civilized World” by Jeff Goodwell

Hydro-electricity, water

- “Cadillac desert: The American West and it’s Disappearing Water” by M. Reisner
- "Colossus. Hoover Dam and the Making of the American Century" by Michael Hiltzik

Petroleum

- "Faster, Higher, Farther. The (Clean Diesel) Volkswagen Scandal" by Jack Ewing
- "High Voltage. The Fast Track to Plug-in the Auto Industry" by Jim Motavalli

Renewables

- “Green Illusions, the Dirty Secret of Clean Energy and the Future of Environmentalism” by Ozzie Zehmer
- “Autonomy, The Quest to Build the Driverless Car and How it Will Reshape our World” by Lawrence D. Burns
- "Bottled Lightning. Superbatteries, Electric cars and the New Lithium Economy" by Seth Fletcher
- "Charging Forward - Lithium Valley, Electric Vehicles and a just Future" by Chris Benner and Manuel Pastor
- “The Great Transition, Shifting from Fossil Fuels to Solar and Wind Energy” by Lester R. Brown
- "Reinventing Fire. Bold Business Solutions for the New Energy Era" by Amory B. Lovins
- “Solar Power. Innovation, Sustainability and Environmental Justice” by Mulvaney
- "Toward a Zero Energy Home. A complete Guide to Energy Self-Sufficiency at Home" by David Johnston & Scott Gibson
- "Let it Shine, The 6,000-year Story of Solar Energy" by John Perlin

Environmental Movement/Climate Change

- "A fierce Green Fire" by Philip Shabecoff
- “The Rule of Five. Making Climate history at the Supreme court” by Richard J. Lazarus
- "What if We Get it Right?" by Ayana Elizabeth Johnson

Video primary sources (upon authorization from prof. Ben)

- “The Crude Poker Game” (documentary) on HBO Go
- “Deepwater Horizon” (movie) by Mark Wahlberg
- “Gasland 2” by Josh Fox (movie)
- “Inside Bill’s Brain: Decoding Bill Gates” Netflix (series) focus on the episode on nuclear energy
- “DamNation” (documentary) a production of Patagonia film production
- “Chernobyl” HBO (series - all episodes)

Course Schedule

Due to the possibility of changes, always refer to the electronic schedule on Canvas

Course Schedule

This schedule is subject to change with fair notice. If necessary, the electronic schedule available on Canvas will be updated along the semester on a week to week basis.

(Read = readings, Question = question to think about and answer from the reading, Keywords & concepts = make sure to have a clear understanding of these after class)

Jan. 23 - Energy Science Fundamentals - Syllabus + [Quiz 1](#) - [Lecture 1 slides](#) - [Panopto video \(28 min.\)](#)
Links to an external site.

Read: ENVS/ENGR 119 Syllabus

Read: Vaclav Smil. 2006. Energy. Encyclopedia of World History. Berkshire Publishing.

Q. What are the skills checked on an area R General Education class like this one?

Q. What is the final research paper assessment in this class?

Q. What will happen if you miss an exam or quiz without a note (unexcused)?

Q. Understand the concept of "energy ladder" as described in class and by Smil.

Q. What are the key shifts in the evolution of energy use?

Q. What changed with the shift from biomass to fossil fuels? When?

Q. What is the larger conclusion of the Smil piece regarding energy, prosperity and sustainability?

Jan. 28-30 - Energy, Society, Environment and Climate Change + Groups selection + [Lecture 2 slides](#) + [Panopto video \(28 min.\)](#)

Links to an external site.
min.)

Links to an external site.

Introduction to the challenges and dilemmas related to energy and its impacts on the environment.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 1 and 2 \(p. 3-70\).](#)

Read: [Bill McKibben, B. 2012. "Global Warming's Terrifying New Math." Rolling Stone. July 24, 2012.](#)

Q. McKibben mentions the +2°Celsius global temperature threshold. Why is this particular value important related to climate change?

Q. In "Global Warming's Terrifying New Math" Bill McKibben mentions three numbers regarding carbon (2, 565, 2,795 Gigatons...). Understand the significance of these data.

Q. In your textbook from Randolph and Master, what is the definition of the word "sustainability"?

Q. In your textbook from Randolph and Master, what is the definition of the word "life cycle analysis" how is this approach related to energy and climate change?

Energy Unit & Conversion + Workshop on [assignment #1 type of problems](#) + [MIT Conversion sheet \(link\)](#) + [lecture 3 slides](#) + [Quiz 2](#) - [Panopto video \(34 min.\)](#)

Links to an external site.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 4, Section 4.1 to 4.3.2 \(p., 117–125\), section 4.4 to 4.5.2 \(p. 127–134\) and section 4.8 to end of chapter \(p. 157-164\).](#)

- Q. What are the key forms of energy (list)
- Q. What units do we use to measure power (list) and energy (list)?
- Q. How are basic unit conversions calculated?
- Q. What are the 1st and 2nd laws of thermodynamics?
- Q. Understand the definition of "efficiency"?

Feb. 4-6 - Coal Energy, Energy systems and Power Plants - Live DEMO with prof. Ben miniature PowerPlant - [Lecture #04](#) + [Panopto video \(15 min.\)](#)

Links to an external site.

Read (optional): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 9, Section 9.1 to 9.8 (p., 359–392)

Watch: PBS - Coal Miners from Two Generations Betting on Trump

Download PBS - Coal Miners from Two Generations Betting on Trump

Play media comment.

- Q. How coal is related to the US electricity supply?
 - Q. How a coal powerplant works?
 - Q. How is electricity made in a thermal/fossil fuel powered power plant?
 - Q. How to apply multiple efficiency factors (from the power plant to light bulb example).
 - Q. Which region in the U.S is heavily dependent on coal-based electricity?
 - Q. What about California - Is CA using Coal to produce electricity?
- US Social/political Issues with Coal Energy + [Quiz #3](#) + [Lecture #05](#) + [Panopto video \(21 min.\)](#)

Links to an external site.

Read: [Jeff Goodell, 2007. Chapter. The Saudi Arabia of Coal. Big Coal: The Dirty Secret Behind America's Energy Future. NY: Mariner Books, p. 3-20.](#)

- Q. Understand what are (1) mechanical energy, (2) chemical energy, (3) thermal energy, (4) electricity, (5) nuclear energy... the differences, and what technologies are used to transform on to another with examples.
- Q. According to Goodell in "The Saudi Arabia of Coal" where is located the "self-proclaimed Energy Capital of the World"?
- Q. As energy is not created, what is the primary source of energy that led to the making of Coal?
- Q. What was the trajectory of Coal use in the US for the last 10 years?
- Q. What is the long term future of Coal energy?
- Q. Why is Coal has been phase-out so aggressively over the last 10 yearSep. 9-11 -

Feb. 11-13 Natural Gas Energy (Lecture #06) - Panopto video (30 min.)

Links to an external site.

Read: Vaclav Smil. 2012. Placing American gas boom in perspective. The American. May 3, 2012.

Watch: GasLand, the movie ([link](#))

Download GasLand, the movie ([link](#))

Play media comment.

2010 American documentary written and directed b

- Q. What are the claims and counter-claims about the American gas boom and the hydraulic fracking technology that allowed it? (list possible environmental and societal impacts, and the natural gas/US energy security link)

Q. In what states is located Marcellus Shale deposit?

Q. What is the opinion of Smil about fracking natural gas in the US?

Natural gas Energy + [Quiz #4](#)

Read: [Chris Mooney. 2011. The Truth About Fracking. Scientific American. November: 80–5](#)

Q. What are the key scientific debates around fracking? What do we know and not know? Are all fracking sites having issue with pollution of the local water sources?

Q. In "The Truth About Fracking" Chris Mooney write about solutions to the fracking controversy... which one is proposed in the article?

Q. Why was Josh Fox threatened to be sued by VP. Dick Cheney following the release of the documentary "Gas Land"?

Q. Why is natural gas often described as the "bridge fuel"?

Feb. 18-20 - [Petroleum Energy \(Lecture #07\)](#) + [Quiz #5](#)

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 13.](#)

[Transportation Energy and efficient vehicles. p. 491-519](#)

Read: [Vaclav Smil. 2011. America's oil imports: A self-inflicted burden. Annals of the Association of American Geographers 101:1-4.](#)

Watch: "The Crude Poker Game" ([documentary up-loaded on Canvas - link](#))

Q. From Randolph and Masters Chap. 13 (published in 2008), the graph titled "Growth of Transportation Petroleum Use by Mode, 1970-2004 with U.S Projections to 2030" shows a very clear prediction. What is it?

Q. Why the predictions from the graph mentioned previously are now contradict by new predictions from the same agency, the EIA? (see slide 4, lecture #07).

Q. What are the factors that drive America's excessive consumption (addiction) of/to petroleum according to Smil?

[Petroleum Energy](#)

Read: [Jeremy Miller. 2011. The Colonization of Kern County: A story of oil and water. Orion Magazine. January/February.](#)

Q. Where are the largest oil fields located in California?

Q. What is the main struggle for the oil industry in this region that is preventing a massive drilling campaign from occurring?

Q. The documentary "The Crude Poker Game" explains the competition between three major oil/petroleum global suppliers to control the oil market and the prices. Who are these three competitors? (Hint: These competitors are mentioned in lecture slide, page 5)

Q. What are the strategies deployed by Russia, OPEC and the US in the documentary "The Crude Poker Game"?

Feb. 25-27 - Sustainable transportation Lecture #08 + Panopto video (38 min.)

Links to an external site.

+ Workshop on final paper Final Research Paper book list and student presentation on their choice. + Quiz #6

Read (optional): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 13, Transportation Energy and efficient vehicles. p.519-538

Read: David Ferris. 2020. Five years after Dieselgate, has VW changed? renews.net/energywire

Read: Kyle Field. 2020. Electric Ford F-150 Will Offer Fleets Game-Changing 40% Lower Cost Of Operation. Cleantechnica.com

Q. What is the name of the air pollutant that VW "Clean Diesel" engines emitted x10 to x40 times over the federal standard limit?

Q. What are the primary obstacles to widespread EV adoption?

Q. Depending on the feedstock for making hydrogen fuel, it could have substantial benefits or very limited benefits if at all. What are the primary challenges to making hydrogen fuel sustainable?

Q. According to Randolph and Masters Chap 13, what are PHEV, BEV, ICE, vehicles?

Q. According to Field in the article related to the 2022 Ford F-150 electric truck, what is the most important commercial aspect that is more likely to convince future buyers of electric trucks?

Mar. 4-6 - Clean Vehicles: EVs & Hydrogen

Read: [Jessica Grady-Bensona and Brinda Sarathyb. 2015. Fossil fuel divestment in US higher education: student-led organising for climate justice. Local Environment.](#)

Q. What factor have helped and hindered divestment movements at US institutions of higher education?

Keywords & concepts: Carbon Emissions Factor, divestment movement.

Carbon Footprint Lecture #09 slides + Quiz 7 + Panopto video (37 min.)

Links to an external site.

Read: [Bill Mc Kibben 2020. The New Yorker. What Have We Learned in Thirty Years of Covering Climate Change?](#)

Q. According to McKibben, what was the Obama administration's climate change response?

Q. In his piece, Bill Mc Kibben advocates for his own state Wyoming that has been highly impacted by the country's move away from Coal. What is he proposing as a replacement for the jobs lost?

Q. What was the most challenging (and longest) at first, when it was discovered that CO2 emissions will have an impact on Earth ability to "trap" sun heat (ei: climate change).

Q. What is the unit internationally used as a standard to track and count carbon emissions everywhere in the World?

Q. What is the standardized unit used to measure the concentration of CO2 in the Earth atmosphere?

Mar. 11-13 - Nuclear Power (Lecture #10) + Panopto Video (43 min.)

Links to an external site.

Watch: "Inside Bill's Brain: Decoding Bill Gates" Netflix(series) YouTube short preview:

<https://youtu.be/XGJMikwF4Lk>

Links to an external site.

Watch: A is for Atom (1952)

Download A is for Atom (1952)

Play media comment.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 4.7, Nuclear Energy. p.150-156](#)

Read: [Charles Perrow. 2013. Nuclear Denial: From Hiroshima to Fukushima. Bulletin of the Atomic Scientists. 65\(5\).](#)

- Q. What is being denied with nuclear denial?
- Q. How do we currently use Uranium 235 (U235) and Uranium 236 (U236)?
- Q. What is the argument pro nuclear that M. Bill Gates is making?
- Q. According to Charles Perrow in "Nuclear Denial from Hiroshima to Fukushima" what has been down played by governments and officials all over the World, for the last 75 years (including by the Japanese government following Fukushima)?

[Nuclear Power Lecture #10 + Quiz 8](#)

Read: [Alexander Cockburn. 2011. In Fukushima's Wake: How the Greens Learned to Love Nuclear Power. New Left Review 68: 75–79.](#)

- Q. Why do some of the climate change activists love nuclear power while other environmentalists (like Greenpeace) are totally opposed to it?
- Q. Name the three California Nuclear Power Plants and their locations.
- Q. What caused the last major global Nuclear accident in Fukushima, Japan?

Mar. 18-20 - Hydro-Power Lecture #11 + Quiz #9 + Panopto Video (30 min.)

Links to an external site.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 4, Section 4.3.3. p., 125–127.](#)

Read: [Paul Robbins 2012. "Hydro-Electric Power." In Mulvaney 2012. Green Energy: An A-to-Z Guide. SAGE Publications.](#)

- Q. How do you estimate the power output of a hydro-electric system (formula)?
- Q. What are the different kinds of hydro-electric power systems?
- Q. Why according to Mulvaney, Hydropower is still "an attractive renewable resource..." in the context of all the other renewable sources of energy ?

Read: [Marc Reisner. 1993. Chapter 4. An American Nile. Cadillac Desert: The American West and its Disappearing Water. Penguin, New York.](#)

- Q. What were some of the challenges encountered at Boulder Canyon?
- Q. In which states is the Hoover Dam located?
- Q. How is looking the future of hydro-electricity in California in the context of the climate change crisis (lecture).

Watch: "Damnation"

Download "Damnation"

Featured movie on Dam deconstruction in the US

Mar. 25 - Midterm Review Session Workshop - Prepare your questions using the midterm [Study Guide](#)

Mar. 27 - Midterm Exam (on Canvas Respondus Monitor, in-class or at-home)

Apr. 8-10 - Renewable energy, [Wind Energy Lecture #12 + Quiz 10 + Panopto video \(33 min. \)](#)

Links to an external site.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 12. Pp. 461-482](#)

- Q. How is the potential wind power output calculated for a specific site and turbine?
- Q. What was the purpose of these first generation wind turbines use by American settlers?
- Q. Masters and Randolph cite Elliott, 1991 which suggests "the wind resource is threoretically sufficient to meet

the entire U.S. demand" but conclude "the fraction of the U.S. demand that could actually be met with wind power in the future is highly uncertain". What is the authors' logic behind this conclusion?

Read: [Roopali Phadke. 2013. Public Deliberation and the Geographies of Wind Justice. Science as Culture 22\(2\): 247–255.](#)

Q. How can the social gap in renewable energy be overcome? Define.

Q. What is the main benefit of current wind power technology (v. other renewable)?

Q. What challenges come with a grid massively powered by wind turbine?

Links to an external site.

Apr. 15-17 - Solar Energy Passive design Lecture #13 + Panopto video (41 min.)

Links to an external site.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 7. Q. Explain passive design for buildings.](#)

Q. Define insolation, insulation, solar path, HDD.

Q. On what side of a building will you get the morning Sun?

Q. On a passive design house south window, what is the name of the device that will completely shades the window at noon in June and completely expose the same window to the warm rays from the sun in December?

Q. What are the differences between a solar thermal collector and a solar photovoltaic panel (PV)?

Earth Day movie (maybe!): "A Fierce Green Fire" Online access through this link: <https://docuseek2-com.libaccess.sjlibrary.org/cart/product/337>

Apr. 22-24 Photovoltaic systems demo + [Solar Energy lecture #14](#) + [Panopto video \(32 min.\)](#)

Links to an external site.

+ [Quiz 11 \(on solar\)](#)

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 11.](#)

Read: [Wright_Solar_HCP_final.pdf](#)

Q. How do photovoltaics generate electricity?

Q. According to Randolph and Masters chap.11 (and today's lecture) what is the potential for rooftop PV in the US? (ie: percentage of total electricity used produced by solar panels installed on all US building rooftops)

Q. Why battery storage is almost mandatory on any modern solar PV system?

Apr. 29 - Life Cycle Assessment lecture #15 + Video 38 min.

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 5 .Energy Analysis and Lifecycle Assessment.](#)

Q. What is EROI and how do you calculate it?

Q. Define Life Cycle Analysis (LCA)and LCC. What are the differences between the two type of approaches?

May 1- [Biofuels, low carbon and carbon negative fuels lecture #16](#) + [Video \(40 min.\)](#) + [Quiz #12](#)

Read (optional): [John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 14. Biofuels Biomass and other alternative fuels.](#)

Read: [M. Fatih Demirbas. 2011. Biofuels from algae for sustainable development. Applied Energy 88: 3473–3480.](#)

Q. What are the first, second, third Generation biofuels made from?

Q. What are the advantages and disadvantages of biofuel production using algae?

- Q. From your textbook (Randolph and Masters p540), what is the largest current use of Ethanol biofuel?
- Q. What is the national Renewable Fuels Standard (RFS) of 2005?
- Q. From Randolph and Masters p562, if South Dakota were to dedicate its 44 million farm acres to produce ethanol, what would its annual yield of biofuels be?

Links to an external site.

May 6 - [Energy Efficiency and Conservation Lecture slides](#) + [Video \(31 min.\)](#)

Read (optional): [John Randolph and Gilbert Masters. 2011. Market transformation to sustainable energy. Ch.16](#)

Read: [Tom Dietz. 2015. Altruism, self-interest, and energy consumption. Proceeding of the National Academies of Sciences. 112\(6\): 1654–1655.](#)

Q. What motivates people to conserve energy according to Dietz?

Read: [Energy efficiency The elusive negawatt The Economist.pdf](#)

Q. Who is Amory Lovins? What organization is he famous to work with?

Q. Define the concepts of "Negawatts" in economics and energy terms.

Q. Define the word "standards" in the energy world.

May 8 - Last week - Review session for final exam - [Final exam study guide](#) + [Video \(30 min.\)](#)

May 8 - Due date for Final research paper

May 12 - make-up date

Final Exam (on Canvas Respondus Monitor):

Tuesday, May 20 8:30-10:30am

<https://www.sjsu.edu/classes/final-exam-schedule/spring-2025.php>