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ENVS 119 - Energy & the Environment 01 - Syllabus, Class intro + Energy History

- Today · You said "GE"???
 - · ENVS/ENGR 119 Syllabus
 - Online protocols
 - Energy and human history
 - · Reading (Smil 2006)
 - Quiz #1
 - Quiz key + Wrap-up



What is General Education class?

GE are required for all 4yr students, all majors.

GE check basic analytical (math) and writing/reading skills, plus understanding of modern society.

GE main topic is chosen by students following their aspirations.

ENVS/ENGR 119 is a GE Area R class opened to students curious about the <u>environment</u>, how <u>society is powered</u>, and the <u>challenge</u> <u>of Climate change</u>.

ENVS/ENGR 119-01 - Syllabus

- 3 units class = 9 hours per week
- 500 pages to read (all on Canvas)
- 28 Lectures (verbal/canvas participation 10% of grade)
- 12 quizzes (10% of grade)
- 3 Assignments (20% of grade -25% per week late)
- 2 Exams (40% of grade)
- Final paper (book review) (20% of grade)
- All exams/quizzes are proctored, in-class, in Lockdown Respondus secured browser.

ENVS/ENGR 119 - Online Protocols

- Permanent Zoom URL for the semester
- Be on time, camera ON, Mic OFF (no surrounding noise)
- Zoom name MUST be exactly your SJSU name
- Participation (1) Raise hand (2) Mic ON (3) Wait prof. call
- Exams/Quizzes = Camera ON, Mic OFF, on Respondus from Windows / Mac OS or iOS (iPad only)
 https://www.sjsu.edu/ecampus/teaching-tools/respondus/faq/index.html
- All exams are timed. All questions are randomized. Replies are also randomized (no way to txt your friend the "correct" answer)
- No Make-up exams or quizzes. Excused = no grade, unexcused = F

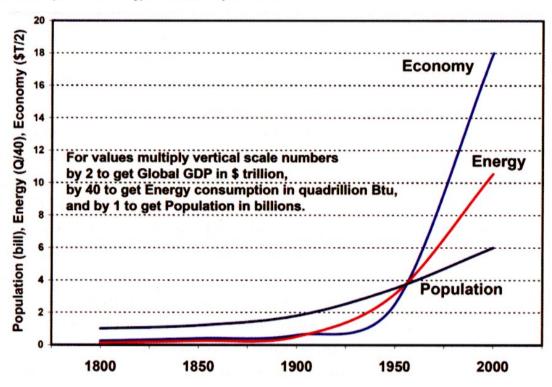
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Q/A

Energy History v. Population and Economy

• Energy use grows with population AND economic dev.





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The Energy Ladder (Technology transition)

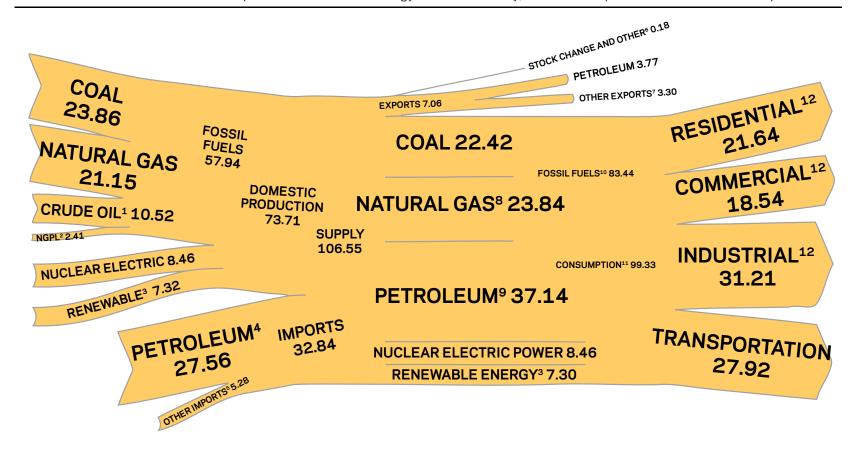
Date	Popula tion	Economy	Energy "age"
<ad 1<="" td=""><td><0.3 billion</td><td><0.1 T\$</td><td>Human + animal powerWood (thermal)</td></ad>	<0.3 billion	<0.1 T\$	Human + animal powerWood (thermal)
1-1800	<1 billion	<0.7 T\$	Human + animal powerWood + coal (thermal)Wind/water
1900-1950	2 billion	2 T\$	Petroleum (travel + transportElectricity age
1950-1980	4 billion	4 T\$	All of the aboveNuclear power
1980-2000	6 billion	36 T\$	Information age, energy and economic growth begin to diverge

What do we do with energy?

Energy Flow, 2008

(Quadrillion Btu)

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¹ Includes lease condensate.

Notes: • Data are preliminary. • Values are derived from source data prior to rounding for publication. • Totals may not equal sum of components due to independent rounding.

Sources: Tables 1.1, 1.2, 1.3, 1.4, and 2.1a.

² Natural gas plant liquids.

³ Conventional hydroelectric power, biomass, geothermal, solar/photovoltaic, and wind

⁴ Crude oil and petroleum products. Includes imports into the Strategic Petroleum Reserve.

⁵ Natural gas, coal, coal coke, fuel ethanol, and electricity.

⁶ Adjustments, losses, and unaccounted for.

⁷ Coal, natural gas, coal coke, and electricity.

⁸ Natural gas only; excludes supplemental gaseous fuels.

⁹ Petroleum products, including natural gas plant liquids, and crude oil burned as fuel.

¹⁰ Includes 0.04 quadrillion Btu of coal coke net imports.

¹¹ Includes 0.11 quadrillion Btu of electricity net imports.

¹² Primary consumption, electricity retail sales, and electrical system energy losses, which are allocated to the end-use sectors in proportion to each sector's share of total electricity retail sales. See Note, "Electrical Systems Energy Losses," at end of Section 2.

ENVS/ENGR 119 - Reading (Smill - 2006)

- Read now Smill 2006 Files/readings/01 smil-article-2006-encyclopedia-of-world-history
- 10 minutes "down" time
- Take quiz #1
- Back to class for quiz key (15 minutes before end of time)

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In the eyes of empire builders men are not men but instruments. • Napoleon Bonaparte

empires themselves. Lastly, their relentless drive for expansion supplied much of the impetus for those ever-enlarging systems of interaction and exchange that eventuated in what we now know as globalization, with all its attractions and drawbacks

See also Imperialism

Further Reading

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Energy

When seen from the most fundamental physical point of view, all processes—natural or social, geological or historical, gradual or sudden-are just conversions of energy that must conform to the laws of thermodynamics as such conversions increase the overall entropy (the degree of disorder or uncertainty) of the universe. This perspective would make the possession and mastery of energy resources and their ingenious use the critical factor shaping human affairs. Also, given the progressively higher use of energy in major civilizations, this perspective would lead logically to a notion of linear advances with history reduced to a quest for increased complexity that is made possible by higher energy flows. People who could command-and societies and civilizations who could use large or high-quality energy resources with superior intensities or efficiencies-would be obvious thermodynamic winners; those converting less with lower efficiencies would be fundamentally dis advantaged.

Such a deterministic interpretation of energy's role in world history may be a flawless proposition in terms of fundamental physics, but it amounts to a historically untenable reductionism (explanation of complex lifescience processes and phenomena in terms of the laws of physics and chemistry) of vastly more complex realities. Energy sources and their conversions do not determine a society's aspirations, its ethos (distinguishing character, sentiment, moral nature, or guiding beliefs) and cohesion, its fundamental cultural accomplishments, its longterm resilience or fragility

Nicholas Georgescu-Roegen, a pioneer of thermodynamic studies of economy and the environment, made a similar point in 1980 by emphasizing that such physical fundamentals are akin to geometric constraints on the size of the diagonals in a square-but they do not determine its color and tell us nothing whatsoever about how that color came about. Analogically, all societies have their overall scope of action, their technical and economic capacities, and their social achievements constrained by the kinds of

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