

AEDE 4320: Energy, the Environment, and the Economy

Autumn 2023

Course Format:

In person
Room 251 Journalism Building
Tues/Thurs 2:20-3:40p

Instructors:

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Teaching Assistant/Grader

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Credit Hours: 3 semester hours.

Prerequisites: 2001 or ECON 2001

Textbooks/Reading:

The textbook for this course is a contemporary book about the energy sector by Daniel Yergin. Given events of the last 6-8 months in Ukraine, this book provides an outstanding description and assessment of the modern global energy sector, which critical to our economic and environmental well-being.

The New Map: Energy, Climate, and the Clash of Nations by Daniel Yergin. New York: Penguin Press. 2020. ISBN 9781594206436.

The book is available in the bookstore, online at Amazon, or through the OSU library, which has access to an online version of the book.

In addition, readings will be sourced from academic articles, newspaper articles, or other written materials. These articles will be provided in Carmen.

Course Description:

This course will deliver content through classroom instruction and Ohio State's Carmen system (<https://carmen.osu.edu/>). Students should anticipate attending class on all days, although some material will be delivered via video with the expectation it will be reviewed before class. Students should be familiar with Carmen as the course outline, lecture slides, videos, quizzes (graded and practice), homeworks and other assignments will be delivered through Carmen. The mid-term and final exams also will be delivered through Carmen. Please read the rest of the syllabus and then review the "student resources" module on Carmen.

Objectives:

At the completion of the course, the student will be able to

- Analyze market trends that influence energy consumption and production, and the demographic, institutional, and economic factors that influence these trends;
- Understand the economics of non-renewable resources and energy exploration;
- Explain economic and policy drivers that enable the transition to renewable energy;
- Recognize externalities associated with energy production, and analyze the benefits and costs of different sources of energy;
- Assess the influence of alternative energy policies on businesses and trade.

Additional objectives specific for each module in the course are provided in the Carmen modules

Course technology

For help with your password, university e-mail, [Carmen](#), or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at [OCIO Help Hours](#), and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** (<http://ocio.osu.edu/selfservice>)
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

Baseline technical skills to use Carmen

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the [Canvas Student Guide](#).

Technology skills necessary for this specific course

- Reviewing any of the course material provided online via Youtube or other video software.
- Zoom text, audio, and video chat if you are unable to make office hours in person.

Required equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection

Required software

- [Microsoft Office 365](#): All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through [Microsoft's Student Advantage program](#). Full instructions for downloading and installation is found <https://ocio.osu.edu/kb04733>.

Carmen Access

You will need to use [BuckeyePass](#) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](#) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click “Enter a Passcode” and then click the “Text me new codes” button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the [Duo Mobile application](#) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and the IT support staff will work out a solution with you.

Course Schedule (Subject to change during the term, with updates on Carmen. Additional reading may be assigned and provided on Carmen):

Week of Aug. 21

- Lectures: (T) Introduction
(R) Where are the world's energy resources?
- Reading: IEA: World Energy Outlook 2022: Executive Summary
Yergin, chapters 1-4
- Quiz 1 (online/Carmen)

Week of August 28

- Lectures (T,R) Demand for energy resources
- Reading: IEA: World Energy Outlook 2022: Chapter 1
Yergin, chapters 5-8
- In Class Discussion: (R) Will demand for energy keep increasing? Why or why not?
- Quiz 2 (online/Carmen)

Week of Sep. 4:

- Lectures: (T) Intro to the Electricity Sector and the levelized cost of electricity (BB)
- Reading: United States Energy Electricity Industry Primer, Pages 1-39 and Appendix A.
Yergin, chapters 9-12
- Exercise: (R) Levelized cost of electricity example and discussion
- HW 1: Trends in energy use and demand (Due Sept. 7)*

Week of Sept 11:

- Lectures: (T) Supply, Market Equilibrium and Surplus
- Exercise: (R) Equilibrating demand and supply in the energy sector
- Reading: World Energy Outlook 2022: Chapter 2
Yergin, chapters 13-16
- Quiz 3 (online/Carmen)

Week of Sept 18:

- Lectures: (T) Energy Supply: Oil, Hubbert's peak, backstop technologies
(R) Coal and Natural Gas Economics (Video)
- Video: Videos for Part 1 Coal and Part 1 Natural Gas
- Reading: Lynch, M. 2018. “What Ever Happened to Peak Oil?”. Forbes. June, 29, 2018
Yergin, chapters 17-20

HW 2: Market equilibrium and market shocks (Due: Sept 21)

Week of Sept. 25

Lectures: (T & R) Energy Supply: Coal and Natural Gas (BB)

Reading: Yergin, chapters 21-25

Exercise: (R) Understanding dispatch in electricity markets

Quiz 4 (online/Carmen)

Week of Oct 2:

Lectures: (T) Discounting, energy supply and the economy

(R) Energy Trading (BB)

Video: Energy trading videos on Carmen (please view before class on Thursday)

Reading: Yergin 26-29

HW 3: Assessing the energy transition (due October 5)

Midterm Exam – October 10, 2023

Week of Oct 16:

Lectures: (T) Market failures: Monopoly/cartel; Price floors and caps

(R) Introduce final project and group formation

Video: Videos on air pollution externalities (View before taking quiz)

Reading: Yergin, 30-33

Quiz 5 (online/Carmen)

Week of Oct 23:

Lectures: (T, R) Externalities, public goods and benefit cost analysis

Reading: Yergin, chapters 34-36

Exercise: Benefit cost analysis

Quiz 6 (online/Carmen)

Week of Oct 30:

Lectures: (T) Economics and Policy of Renewable Energy (BB)

(R) Renewable energy policy, markets and credits

Reading: Yergin, chapters 37-40

Exercise: Levelized cost of electricity for renewables

(Don't forget to work on group project with your teammates)

Week of Nov 6:

Lectures: (T) Introduction to climate economics and policy (BB)

(R) Social cost of carbon and net zero

Reading: Yergin, chapters 41-44

Braine, B. and B. Feldman. "Economics of Greenhouse Gas Trading: Reaching Economic Goals Cost Effectively." International Emissions Trading Association.

(Don't forget to work on group project with your teammates)

Quiz 7 (online/Carmen)

Week of Nov 13:

Lectures (T) Businesses, energy, and Science-Based Targets Initiative (SBTi)

(R) Approaches to lowering carbon emissions from around the world

Reading: Yergin, 45-46 + Conclusion

Group project paper due November 17, 11:59p

Week of Nov 20:

Work on group project with your teammates

Week of Nov 27:

(T) Course summary

(R) Group project presentations

Week of Dec 4

(T) Group project presentations

Final exam on December 8

Instructor's policy on late work:

Everything is due by the date given on syllabus and on Carmen. Only homework can be turned in late without an excuse, however you will lose 5% per day each day you are late, and you can only turn it in up to 1 week after the assignment is due. After that, you will be assigned a 0 for the homework. All other assignments must be accomplished by the due date. You will not be allowed to take a quiz late without providing documentation (see below). Documentation must be provided to the TA for our records, and must include a written explanation, along with any other evidence you can provide (e.g., a note from a doctor).

How your grade is calculated:

Homework (3)	15%
Quiz grades	15%
Group project	
Paper	15%
Presentation	15%
Midterm	17%
Final Exam	23%
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Total	100%

Description of Course Activities:

In-Class Exercises: Several times during the course we will show you how to conduct quantitative analysis. The homework problems are quantitative in nature, and during these class sessions we will show you how to do the analysis. These sessions will occur during the regular class time period. We will not take attendance, and no points are allocated for these classes, yet these classes are critical. This is where we show you what to do on the homework and we provide you with sample problems.

Homework: There are 3 homework assignments during the term. They occur in the first half of the term. Homework assignments are more in-depth than the quizzes, and they are analytical in nature. They are intended to give you experience working with data and numbers. Homework turned in late will be penalized 5% per day for up to a week. Homework can only be turned in for one week after the due date.

Quizzes: There will be 7 online quizzes during the term. These are short quizzes that will test your knowledge of material in the lectures, reading, or other assigned material. Quizzes will be weekly, except for weeks when a homework assignment is due, the mid-term exam, or some other substantial assignment/activity occurs. Quizzes are due on Friday and cover the material over the period since the last quiz.

Group Project: There is a group project for this class that you will work on during the second half of the term. The group project is composed of two parts. The first part is to work with your team to develop a short, written position statement about the question you are asked to research. You will turn this in in mid-November. The second part is a class presentation that your group will prepare and present the last week of class.

Midterm and Final Exam: There will be one midterm exam, given on October 10, 2023. There will be a final exam, given on December 8, 2023. These will be taken online and must be done within the typical allotted time period (e.g., a single class period of 80 minutes for the midterm and 100 minutes for the final). We will provide you with a detailed study guide for each exam.

Documented illness, death in the family, religious accommodation (see below), or other extreme circumstances are the only excused absences for any assignments in the course, including exams and quizzes. All excused absences will require written documentation of the reason for the excuse. Make-up assignments, exams or quizzes will be given only in the event of excused absences.

Grading Scale:

<u>Percentage</u>	<u>Grade</u>	<u>Percentage</u>	<u>Grade</u>
93-100	A	73-76.9	C
90-92.9	A-	70-72.9	C-
87-89.9	B+	67-69.9	D+
83-86.9	B	60-66.9	D
80-82.9	B-	<60	E
77-79.9	C+		

COURSE POLICIES

The course is designed for 8-9 hours of time per week, following a model of on campus teaching with 3 hours of in class time and 5-6 hours of out of class time. There is no attendance requirement, but you should show up because that's how you will learn the techniques used on the homeworks, quizzes, and tests. The timing and due dates are given on Carmen.

UNIVERSITY POLICIES

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at [Student Life](http://studentconduct.osu.edu) <http://studentconduct.osu.edu>.

Ohio State's academic integrity policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Intellectual Property (covered by copyright) includes Course materials (Text, Audio, Video, Multimedia, Sims, Apps, etc.), and Student Generated materials

Religious Accommodation

It is Ohio State's policy to reasonably accommodate the sincerely held religious beliefs and practices of all students. The policy permits a student to be absent for up to three days each academic semester for reasons of faith or religious or spiritual belief. Students planning to use religious beliefs or practices accommodations for course requirements must inform the instructor in writing no later than 14 days after the course begins. The instructor is then responsible for scheduling an alternative time and date for the course requirement, which may be before or after the original time and date of the course requirement. These alternative accommodations will remain confidential. It is the student's responsibility to ensure that all course assignments are completed.

Campus Free Speech

Our [Shared Values](#) include a commitment to diversity and innovation. Pursuant to these values, the university promotes a culture of welcoming differences, making connections among people and ideas, and encouraging open-minded exploration, risk-taking, and freedom of expression. As a land-grant institution, the university takes seriously its role in promoting and supporting public discourse. To that end, Ohio State is steadfastly committed to protecting the First Amendment right to free speech and academic freedom on its campuses, and to upholding the university's academic motto — "Education for Citizenship." The [Campus Free Speech policy](#) adopted in May supports this commitment.

Weather or Short-term Closing

Should the university cancel in-person classes, I will notify you as to which alternative methods of teaching will be offered to ensure continuity of instruction for this class. Communication will be via email and Carmen.

Disability Services:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability

Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Requesting accommodations

If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact your instructor privately as soon as possible to discuss your specific needs. Discussions are confidential. In addition to contacting the instructor, please contact the Student Life Disability Services at [614-292-3307](tel:6142923307) or ods@osu.edu to register for services and/or to coordinate any accommodations you might need in your courses at The Ohio State University.

Go to [Office of Student Life - Disability Services](#) for more information.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- [Carmen \(Canvas\) accessibility](#)
- Streaming audio and video
- Synchronous course tools
- [Definition OSU](#)
- [Overview of Accessibility at OSU](#)
- If you require specific software for the course list or provide a link to the software's accessibility privacy statements
 - [Adobe Connect \(Carmen Connect\) Accessibility](#) [Adobe Privacy Policy](#)
 - [MediaSite Accessibility Statement](#)
 - [Microsoft Office Accessibility](#) [Microsoft Office 365 Privacy](#)
 - [Proctorio Accessibility](#) [Proctorio Privacy](#)
 - [Top Hat Accessibility](#) [Top Hat Privacy](#)

Diversity:

Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

UNIVERSITY RESOURCES:

Counseling and Consultation Services:

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other

concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.

Title IX:

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at titleix.osu.edu or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu. Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit equity.osu.edu or email equity@osu.edu.

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