Course Description & Objectives
Recent interest in climate change, in general, as well as large projects like Ivanpah Solar Facility, Three Gorges Dam, Keystone XL, Hinkley Point, in particular, has focussed the attention of urban planners on the impacts of land use and transportation planning on energy use. This course seeks to explore the reciprocal connections between all aspects of energy (production/conversion, distribution and use), land use, environment and transportation. Evaluation of Federal, state and local policies on energy conservation, alternative energy sources are emphasised. At the end of the course, the students are expected to have learnt the skills to critically analyse impacts, interdependencies and uncertainties of various energy conservation measures and production technologies on different sectors, organisations and communities.

Prerequisites & Preparation
This course does not require any prior preparation apart from basic physics and economics. It does extensively use spreadsheets, so experience in using them is helpful.

The course moves quickly and has voluminous readings. The course requires vigorous in-class participation, ability to digest, interpret and critically evaluate large amount of technical literature and extensive out-of-class research.

Course Policies
The following set of course policies is not meant as an exhaustive list. If in doubt, ask for permission and clarification.

COVID-19
We are expected to meet in person for most of the course. Regardless of vaccination status, everyone is expected to wear a mask in the classroom in accordance with the University Community Standards. We will revisit this policy as things change.

If the pandemic gets worse, we will meet online using Zoom [https://unc.zoom.us/j/99556045272](https://unc.zoom.us/j/99556045272)

On days, we have guest lectures, I am asking the guests to lecture via zoom for safety and convenience. On those days we will meet online at the above zoom link.
Grading

- 30% (Mostly) Weekly homeworks
- 20% Group project 1 (Critically evaluate an Environmental Impact Statement)
- 30% Group project 2 (Consulting report to a client)
- 10% Pop quizzes (best 5 of 6)
- 10% Class participation

It is your responsibility to show to the instructor/grader how you arrived at the conclusions that you did.

Assignments, including homeworks, are submitted in Sakai usually due on Fridays by 5PM. Please do not send them by email.

The homework problem sets provide practice for analytical techniques described in the class and in the textbook. You are expected to use spreadsheets and other statistical software for completing the problem sets. It is expected that you are familiar with these software, or you will use online resources or websites to troubleshoot. If you do not have access to a computer with required software, please let me know. A submission to a problem set is a single document (pdf). Emphasis is placed on the readability of your argument and solution. Points will be deducted if the information is scattered in multiple places and files. I strongly suggest that you get familiar with writing math equations in electronic documents. All equations, data, tables, research, and help should be cited. All tables should be sourced.

Follow a consistent citation style. I recommend UNC citation builder. Also see, the Writing Center’s advice.

Every week, students do a peer grading of a random peer’s homework submission. The point really is not to grade the HW but to learn how others are approaching the material.

For the group projects, graduate students in the class are expected to explore the issues in-depth and demonstrate your understanding of key issues in the field of energy planning. Usually, graduate students team up with other graduate students for the group projects. The papers and presentations will be graded differently than your undergraduate peers. H (High Pass) for graduate students is equivalent to A for undergraduate students.

Appropriate planning and time management significantly reduces stress at the end of the semester. Participation in class and timely completion of problem sets and other assignments is imperative.

Attendance

Students are responsible for keeping up with the material this course covers. During the pandemic, it is imperative that you do not attend the class, especially if you are symptomatic or had an exposure. You do not need to seek permission to miss classes. This is a graduate class and I expect that you will act responsibly towards yourself and your classmates.

Assigned Readings

The following textbooks are required for this class:

(henceforth RM)

The textbook should be available at the Student Stores and is on reserve at the Undergraduate library. The textbook contains a lot of information on the technology aspects of various types of energy production and distribution. Proficiency of these materials is not the goal of this course, however, they should be understood to a sufficient depth that would allow for better land use, transportation and environmental planning and policies.

Other books that are recommended (not required) for purchase are:


Most of the other readings are derived from journal articles and book chapters. These readings, excluding the chapters from the textbook, are posted on the Sakai. Usual copyright notices apply. Students should read the material before class and be prepared to discuss it in class.

E-mail & Calendar

Sakai messaging system is the preferred way to communicate with me. If you insist on sending messages using your email client, please use “PLAN547” in the subject line, so that it is not trapped by the aggressive spam filtering, I implement. I will do the same, in my emails to you.

The class has a group email list. Please be considerate to your colleagues.

The course calendar should list the most up to date information about topics, guest lectures, field trips, due date etc. Please pay attention to it and subscribe in your calendaring software. The schedule described in this document is very tentative.

You can set up an appointment on my calendar, if you want to meet outside office hours.

Academic Integrity

You are accountable to the integrity of the work you submit. You are allowed and encouraged to consult with your peers and use the resources in the library and on the web for many of your assignments. However, all help (including your peers’), all verbatim text and images that are not your own, should be explicitly acknowledged and cited. Non-attribution carries severe penalties.
Schedule (Tentative)

Preliminaries

Aug 19 (Thu): Introduction
• RM Chapters 1 & 4

Aug 24 (Tue): Basic Economic Analyses
• RM Chapter 5

Production, Transmission & Distribution of Energy

Aug 26 (Thu): Environmental Impacts of Energy Production

Aug 31 (Tue), Sep 2 (Thu): Conventional Electricity Production & District Energy Systems
• RM Chapters 9 & 10

Sep 7 (Tue): Campus Energy Planning (Guest Lecture: Lew Kellogg)

Sep 9 (Thu): Photovoltaic & Other Solar
• RM Chapters 11 & § 12.1 & 12.4
Sep 14 (Tue): Siting Solar & Design (Guest Lecture: Gabe)


Sep 16 (Thu): Machine learning Applications in Solar (Guest Lecture: Kyle Bradbury)


Sep 21 (Tue): Wind Energy

- RM Chapters 12

Sep 23 (Thu): Biofuels & Alternatives

- RM Chapters 14

Sep 28 (Tue): Shale & Unconventional Oil


Sep 30 (Thu), Oct 5 (Tue), Oct 7 (Thu): Project 1 Presentations

Energy Politics, Policy & Institutions

Oct 12 (Tue): Role of Public Utility Commissions (Guest Lecture: Jeff Hughes)

Oct 14 (Thu): Integrating spatial and energy planning


Oct 19 (Tue): Energy Politics

- RM Chapters 17 & 18

Oct 26 (Tue): Evolution of North Carolina Clean Energy Policy (Guest Lecture: Daniel Brookshire)

Consumption, Conservation & Efficiency

Oct 28 (Thu): Transportation energy use

- RM Chapter 13

Nov 2 (Tue): Electrification of Transportation

- TBD

Nov 4 (Thu): Interactions of Land Use and Transportation


Nov 9 (Tue): Residential Energy Consumption

- RM Chapter 6

Nov 11 (Thu): Green buildings

Nov 16 (Tue): Commercial/Institutional energy consumption/EQUEST tutorial
  - TBD

Nov 18 (Thu), Nov 23 (Tue), Nov 30 (Tue): Project 2 Presentations