

Planning for Urban Energy
PLA 4010
GSAPP Columbia University
Spring 2018

Introduction

Urbanization has been associated with increasing energy use and related GHG emissions and climate vulnerabilities. Yet, urban energy systems have almost been a taken-for-granted infrastructure system, out of the realm of urban planning. Due to climate change as well as threats of “peak energy use” however, these systems are coming under increasingly intense scrutiny. Understanding and planning for urban energy may be one of the most important tasks for planners in the future. This class explores urban energy systems, their components and related planning issues.

Course description and learning objectives

This class introduces concepts related to planning for urban energy systems. This coming semester we will read a series of books and articles that describe the elements and dynamics of urban energy systems, the climate impacts of these systems and related climate vulnerabilities. We will examine the electric grid, the relationship between development and energy, primary energy supply, end uses and policies at multiple scales. Throughout the semester we will also broach issue of climate change, whether they are related to greenhouse gas emissions and reducing such emissions (low-carbon planning) or identifying and addressing urban climate vulnerabilities (heat and higher demand for cooling, storm surge and infrastructure vulnerability, etc.).

The learning objectives for the course include:

- Identification of the general dynamics and components of energy systems
- Identification of the urban aspects of energy systems
- Explanation of shifts in urban energy planning and policy over the last two decades
- Synthesis and prediction of major future challenges for urban energy systems

Course methods

During the semester we will focus on several texts and a number of articles. For each class, reading requirements are provided in the syllabus and posted in CourseWorks. During the beginning of the semester the course is run a lecture, but quickly moves into seminar format. The seminars are run by students and all will be expected to contribute and/or present thoughts, information and experiences. Presentations and participation are a major contribution to the success of the class.

Student evaluations

Evaluations are based upon:

- Class attendance and participation. Participation in class discussion is vital for learning. As mentioned, a significant portion of class time is devoted to discussion of readings and class lectures;
- The completion of three further assignments.
 1. First students are required to run a seminar and perhaps more than one, depending on the size of the class. These student seminars can be given by groups of students.

2. Second, students will prepare a paper based upon, or related to any topic directly covered during the seminar (planning for urban energy systems). The paper is due at the end of the semester. The final paper should be approximately 2500-4000 words including bibliography, tables and charts.
3. Finally, students will present a group project on one aspect of planning for the urban energy system of New York City. This project could focus on planning for energy supply, energy transformation infrastructure, vulnerabilities or mitigation measures.

Percent of Class activity	final grade	Due date
Class participation	10%	Throughout
Assignment 1 – Leading a seminar	20%	
Assignment 2 – Paper	50%	4 May
Assignment 3 – Group presentation	20%	Last week

Class policies

There are no incompletes given for the course, with the exception of proof of a medical emergency. Late papers will be marked down.

Course readings

- William L. Thompson, 2016. *Living on the Grid, The Fundamentals of the North American Electric Grids in Simple Language*, Bloomington, IN; iUniverse.
- L. Danny Harvey, 2010. *Energy and the New Reality 1: Energy Efficiency and the Demand for Energy Services*, London: Earthscan
- Jose Goldemberg and Oswaldo Lucon (2009), *Energy, Environment and Development*, Routledge, London.
- [Arnulf Grubler \(Links to an external site.\)Links to an external site.](#) and David Fisk (Eds.), 2012. *Energizing Sustainable Cities: Assessing Urban Energy 1st Edition*, London, Routledge
- Harriet Bulkeley, Vanesa Castán Broto, Mike Hodson, Simon Marvin (Eds.), 2010. *Cities and Low Carbon Transitions*, London, Routledge

These books are in the Columbia University Bookstore

Office hours and classroom policies

I am available for discussion most Thursdays. I do not, however, have an office here on campus, so we will meet in common spaces at Columbia. Note that while I respond to email as promptly as possible, if you send me an email late on Friday I may not respond until Monday.

During class time, please turn off your phones and do not bring/use earphones.

Academic integrity

Columbia University regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The University is committed to enforcing its Policy on Academic

Integrity and will pursue cases of academic dishonesty according to the Academic Integrity Procedures. Plagiarism, dishonesty, or cheating in any portion of the work required for this course will be punished to the full extent allowed according to Columbia University College regulations.

Tentative semester schedule

- 18 January: Introduction
- 25 January: Introduction to the 1.5 °C global goal limit to climate change (Instructor)
- 1 February: *Living on the Grid*, Thompson (2016) (students)
- 8 February: What are the pathways to achieve the 1.5°C goal? (Instructor)
- 15 February: *Energy Efficiency and the Demand for Energy Services*: Part 1 Harvey (2010) (Students)
- 22 February: Potential impacts of 1.5°C world (Instructor)
- 1 March: *Energy Efficiency and the Demand for Energy Services*: Part 2 Harvey (2010) (Students)
- 8 March: The role of cities in reaching 1.5°C (Instructor)
- 15 March: Spring Recess: No class
- 22 March: *Energy, Environment and Development*, Goldemberg and Lucon (2009) (Students)
- 29 March: North American energy system contributions to the global climate cycle (dynamics since 2003) (Instructor)
- 6 April: *Energizing Sustainable Cities*, Grubler and Fisk (2012) (Students)
- 12 April: Global predictions of heat waves and urban vulnerability (Instructor)
- 19 April: *Cities and low Carbon Transitions*, Bulkeley et al (2010) (Students)
- 26 April: Student presentations