GESM 130 - Seminar in Social Analysis

Infrastructure, Energy, and Society

Syllabus

Think about some of the processes that go into making a simple sandwich: Wheat that is harvested from an irrigated field moves to a flour mill, then on to a bakery, then to a supermarket, and finally from there to your home. The trains, trucks, and automobiles involved in this supply chain use vast networks of railways and roads. Even more vast networks of information systems allow for safe and timely transport, efficient pricing of goods and services, and your credit-card purchase, and this entire process depends upon a backbone of energy from various sources to operate.

Given current megatrends such as population growth, the economic development of countries such as India, China, and Brazil, and the growth of cities around the globe, opportunities for infrastructure development abound. Exceptionally rapid rates of urbanization are leaving cities struggling to keep pace with burgeoning infrastructure demands. These demands vary around the globe: From power-grid and broadband Internet projects in Sub-Saharan Africa, to renewable energy and low-carbon-emission sustainable urban systems in East Asia and the Pacific, to projects tying together sustainability and the environment in Latin America. Each region is ripe with opportunity, yet also presents its own unique set of challenges. While commodity, water, transportation, information, and energy infrastructures are complex and highly interrelated in a physical sense, none of these systems can successfully operate without taking into account both the people and the social, political, economic and environmental context in which they operate. Stakeholder's beliefs and values impact their thinking about infrastructure and energy; Whether these beliefs are positive or negative often depends upon a set of moral and ethical judgments –which can vary greatly from those of the engineers tasked with managing projects, especially in cases involving indigenous peoples. Overlooking stakeholder beliefs and values and a lack of public communication, education and outreach has lead to protests and the delay or halting of many projects worldwide. Given the vast geo-political variability of the settings for these projects, and the global availability of social media to enable self-organizing behavior, understanding and managing the public-private interface, taking account issues including environmental stewardship and social responsibility is more important than ever. Students who complete this section of GESM 130 will improve their understanding of the interplay of the broad set of environmental, social, economic and political factors that affect engineering decisions related to infrastructure and energy. Students will learn how to take into account the lessons learned and best practices gleaned from a variety of infrastructure case studies in order to better manage future projects.

To achieve these goals, the course will take a two-tiered approach: First, students will learn about different forms of infrastructure and relevant social concepts including the social, economic and environmental pillars of sustainability, social equity and

environmental justice. In the second half, students will use these concepts as an analytical framework to better understand numerous case studies that have been selected on the basis of their engineering/societal importance. Students will demonstrate their understanding of these analytical tools by completing a series of short social impact papers and a comprehensive project paper related to a case study of their choosing. Lastly, students will present their findings to the class. The aim is to transfer knowledge derived from the successes and failures of actual projects in a systematic way, in order to inform the dialogue with clients and stakeholders in future projects.

The GESM grading is as follows:

Six 5-page "social-impact" papers (equally weighted)	30%
Comprehensive project paper	30%
Project presentation	10%
Class participation	10%
Midterm Exam	10%
Final Exam	10%

Instructor Information:

Julie Albright - albright@usc.edu Office hours TBD

Edward Maby - PHE 606, 0-4706, maby@usc.edu Office hours: TTh 1:00 - 2:00

Required Texts

C. Jones, *Routes of Power: Energy and Modern America* (Harvard, Cambridge, 2014).

D. Nye, *Consuming Power: A Social History of American Energies* (MIT Press, Cambridge, 2001).

A course Reader with chapters from other books will be available at the USC Bookstore. Other required readings (journal papers) will be available at the course webpage (TBD).

The following text is not required but highly recommended:

B. Hayes, *Infrastructure: A Field Guide to the Industrial Landscape* (Norton, New York, 2005).

Tentative Course Schedule

Required Readings (to be completed before the indicated class)
Supplementary Suggested Readings

Social Analysis Papers
Class due-dates for 5-page papers (reflecting material from the preceding week)

Week 1

M - Seminar Overview and Objectives

W - A Unifying Theme - The Pillars of Sustainability: Social, Environmental, Economic

Creating the Future We Want - Hecht et al.
Response - Stutz
Rejoinder - Hecht et al.
Sustainability: An Economist's Perspective - Solow

Week 2

M - Martin Luther King Day - No class

W - Infrastructure: Accessing Commodities

Nature's Metropolis - Cronon (Reader)
Pricing the Future: Grain (Chapter 3)
The Wealth of Nature: Lumber (Chapter 4)
Annihilating Space: Meat (Chapter 5)
Aluminum, Commodity Chains, and the Environmental History of the Second World War - Evenden

Infrastructure, Hayes (Chapters 1 and 3)

Paper 1 - A Personal Interpretation of Sustainability

Week 3

M - Whose Resources? The Tragedy of the Commons

The Tragedy of the Commons - Hardin
Extensions of "The Tragedy of the Commons" - Hardin
The Tragedy of the Commons Revisited - Crowe
The Struggle to Govern the Commons - Dietz

W - Infrastructure: Moving People and Freight

Railroads Triumphant: The Growth, Rejection, and Rebirth of a Vital American Force - Martin (Reader, Chapter 1)
American Railroads: Decline and Renaissance in the Twentieth Century - Gallamore and Meyer (Reader, Chapter 13)
"The Most Reliable Time": William Bond, the New England Railroads, and Time Awareness in 19th-Century America - Stephens

Prime Movers of Globalization: The History and Impact of Diesel Engines and Gas Turbines - Smil (Chapters 5 and 6)
Infrastructure, Hayes (Chapters 8 - 12)

Week 4

M - Who Benefits? Who Pays?

Reconsidering Social Equity in Public Transit - Garrett and Taylor
No Single Path: Ownership and Financing of Infrastructure in the 19th and 20th Centuries - Jacobsen and Tarr
Beyond Privatization: Rethinking Private Sector Involvement in the Provision of Civil Infrastructure - Little

W - Infrastructure: Managing Water and Waste

Global Hydrological Cycles and World Water Resources - Oki and Kanae
Groundwater in Peril - Jones

Gone Tomorrow: The Hidden Life of Garbage - Rogers
Infrastructure, Hayes (Chapters 2 and 13)

Paper 2 - The Tragedy of the Commons as Applied to a Commodity Chain

Week 5

M - Who Needs a Voice? Environmental Justice

Environmental Justice - Mohai et al.
Environmental Justice / Climate Justice - Cox
The Politics and Reality of Environmental Justice: A History and Considerations for Public Administrators and Policy Makers - Bowen and Wells

Which Came First? Toxic Facilities, Minority Move-in, and Environmental Justice - Pastor et al.

W - Infrastructure: Supplying Energy

Routes of Power: Energy and Modern America - Jones (Chapters 1 - 4)

Infrastructure, Hayes (Chapters 4 - 6)

Paper 3 - The Los Angeles Bus Fare: Cost Recovery or Subsidization?

Week 6

M - President's Day - No class

W - Whose Loss? The Environment and Societal Consequences

Infrastructure and the Environment - Doyle and Havlik

Something New Under the Sun: An Environmental History of the Twentieth-Century World - McNeil
Technology-Led Climate Policy - Galiana and Green

Paper 4 - Environmental (In)Justice: A Contemporary Example

Week 7

M - Infrastructure: Communicating

The Master Switch: The Rise and Fall of Information Empires - Wu (Reader, Chapters 20 and 21)

Infrastructure, Hayes (Chapter 7)

W - Who Regulates?

Digital Crossroads: American Telecommunications Policy in the Internet Age - Nuechterlein and Weiser (Reader, Chapters 4 and 5)

Paper 5 - An Energy System and Its Environmental/Social Implications

Week 8

M - Cultural Perspectives

An Environmental History of Russia - Josephson et al. (Reader, Chapter 4)
The Struggle for Sustainability in Rural China - Tilt (Reader, Chapter 7)
Which Rights are Right? Water Rights, Culture, and Underlying Values - Pradham and Meinzen-Dick

W - Midterm Exam (Essay related to "social-impact" issues)

Week 9

M - Energy and Society 1

Consuming Power: A Social History of American Energies - Nye (Chapters 1 - 5)

W - Energy and Society 2

Consuming Power: A Social History of American Energies - Nye (Chapters 6 - 9)

Paper 6 - A Social Analysis of Net Neutrality: Yes or No?

Week 10

M - Coal: The Mohave Generating Station and the Navajo/Hopi Nations

Mohave Generating Station Project Description - California Public Utilities Commission
The Black Mesa Syndrome: Indian Lands, Black Gold - Nies
Replacing Coal with Green Jobs in Navajo Nation - Liu
Hopi Tribal Council Bans Environmental Groups - Navajo-Hopi Observer

Drawdown: An Update on Groundwater Mining on Black Mesa - Natural Resources Defense Council

W - Biofuels

The Economics of Current and Future Biofuels - Tao and Aden
Bioenergy and Agriculture: Promises and Challenges - Kammen

Project Proposal Due

Week 11

M - Water for Los Angeles (Only): The Los Angeles Aqueduct

Intake - LADWP (Los Angeles Aqueduct Centennial Edition)
Water and Power - Kahrl (Reader, Chapters 6 and 7)

W - Toilet to Tap: Recycling Water for Los Angeles

Domestic Wastewater Recyling: "Toilet to Toilet" and "Tap to Tap", Instead of "Toilet to Tap" - A New Approach - Antholz et al.
Political Analysis: The Legacy of Toilet to Tap - KPBS

Week 12

M - Sustainable Agriculture?: Water for the San Joaquin Valley

The Fall and Rise of the Wetlands of California's Great Central Valley - Garone (Reader, Chapters 2 - 4)
Endangered Species and the Politics of Place in California - Alagona (Chapter 8 - The Delta Smelt: Politics by Another Name)
San Joaquin Valley, California: Largest Human Alteration of the Earth's Surface - Galloway

W - Sustainable Water?: Agriculture and the Salton Sea

Salt Dreams: Land and Water in Low-Down California - deBuys and Myers (Reader, Chapters 14 - 16)
The Salton Sea: Death and Politics in the Great American Water Wars - Simon
Alternative Futures for the Salton Sea - Letey

Project Progress Report Due

Week 13

M - The Smart Grid: Demand Response Technologies

An Informatics Approach to Demand Response Optimization in Smart Grids - Simmhann
Assessment of Demand Response and Smart Metering - Federal Energy Regulatory Commission

W - Social Influence Using Virtual Systems: Social Media and Energy Conservation

Consumer Response to Product-Integrated Energy Feedback: Behavior, Goal-Level Shifts, and Energy Conservation - McCalley et al.
Consumption and Materialism: An Invitation to Environmental Sociology - Gardner and Stern
The Short List: The Most Effective Actions U.S. Households Can Take to Curb Climate Change - Gardner and Stern

Week 14

M - The Port, the Freeway, the Rail Link, and the Diesel Death Zone: Los Angeles Shipping

The Docks - Sharpsteen (Reader, Chapter 5)
Reducing Port-Related Truck Emissions: The Terminal-Gate Appointment System at the Ports of Los Angeles and Long Beach - Giuliano
California's I-710: Nationally Important, Community Initiated, and Redirected - ICF International
San Pedro Bay Ports Rail Study Update (Executive Summary) - Port of Los Angeles, Port of Long Beach

W - Subway to the Sea: Effective Transportation or Misguided Effort

Proposed Expansion of the Los Angeles Metro Rail System - Ware
The Mythical Conception of Rail Transit in Los Angeles - Richmond
Better Transportation Alternatives to Los Angeles - Rubin and Moore

Week 15

Project Presentations

Final Exam

Essay questions will concern the readings and class discussions from throughout the semester.

The term paper relating to the project is due on or before the final-exam date.

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* http://emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.