

GESM 131g - Seminar in Social Analysis

Infrastructure, Energy, and Society

Spring 2019

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 led 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 131g 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 131g grading is as follows:

Six 5-page, double-spaced "social-impact" papers	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

J. Albright, *Left to Their Own Devices: How Digital Natives Are Reshaping the American Dream* (Prometheus Books, Buffalo, 2019).

R. J. Gordon, *The Rise and Fall of American Growth* (Princeton U. Press, Princeton, 2016). Available in paperback.

D. Nye, *American Technological Sublime* (MIT Press, Cambridge, 1994). Available on line. (Chapters 1, 6, and 7 required. Other chapters recommended.)

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

Recommended Texts

W. Cronon, *Nature's Metropolis: Chicago and the Great West* (Norton, New York, 1991).

B. Gumprecht, *The Los Angeles River: It's Life, Death, and Possible Rebirth* (Johns Hopkins, Baltimore, 1999).

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

B. McCullough, *How the Internet Happened: From Netscape to the iPhone* (Norton, New York, 2018).

J. R. McNeill and P. Engelke, *The Great Acceleration: An Environmental History of the Anthropocene Since 1945* (Harvard University Press, Cambridge, 2014).

H. Rogers, *Gone Tomorrow: The Hidden Life of Garbage* (New Press, New York, 2005).

**Tentative Course Schedule
Spring Semester (Monday and Wednesday Sessions)**

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

Sustainability: An Economist's Perspective - Solow

Creating the Future We Want - Hecht et al.

Response - Stutz, Rejoinder - Hecht et al.

Infrastructure in the Context of Social Questions

Week 2

M - Infrastructure: Accessing Commodities

*Aluminum, Commodity Chains, and the Environmental History
of the Second World War* - Evenden

Infrastructure - Hayes (Chapters 1 and 3)

Nature's Metropolis - Cronon (Chapter 3)

W - 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

Paper 1 - A Personal Interpretation of Sustainability

Week 3

M - Infrastructure: Moving People and Freight

*The Impact of the Railroad on American Society: A Communication
Perspective of Technology* - Matusitz
The Rise and Fall of American Growth - Gordon (Chapter 5)

Infrastructure - Hayes (Chapters 8 - 12)

W - Who Benefits? Who Pays?

*Architectural Exclusion: Discrimination and Segregation Through Physical
Design of the Built Environment* - Schindler (Parts I and II)

Do Artifacts Have Politics? - Winner
*No Single Path: Ownership and Financing of Infrastructure in the
19th and 20th Centuries* - Jacobsen and Tarr

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

Week 4

M - Infrastructure: Energy and Industrialization

Consuming Power - Nye (Chapters 4, 5, and 6)

The Rise and Fall of American Growth - Gordon (Chapter 8)
Energy, Society, and Science: The Fifty-Year Scenario - Crabtree, Kocs, and Aláan
Infrastructure, Hayes (Chapters 4 - 6)

W - Whose Impact? The Environment and Societal Consequences

Infrastructure and the Environment - Doyle and Havlik

The Great Acceleration: An Environmental History of the Anthropocene Since 1945 -
McNeil and Engelke

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

Week 5

M - 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)

W - Who Has a Voice? Environmental Justice

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

Environmental Justice - Mohai et al.

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

Week 6

M - Infrastructure: Communicating (Before the Internet)

The Rise and Fall of American Growth - Gordon (Chapters 6, 12, and 13)

Infrastructure, Hayes (Chapter 7)

W - Who Runs the System? Regulation

A Brief History of Internet Regulation - Ehrlich
Internet Freedom & Political Space - Rand Corporation (Chapter 8)

The Net Neutrality Debate in the United States - Hart

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

Interlude: Aesthetics and Cultural Perspectives

Week 7

M - The Classical and Technological Sublime

American Technological Sublime - Nye (Chapters 1, 6, and 7)

The Aesthetics of Wind Energy - Good

American Technological Sublime - Nye (Other Chapters)

W - The Digital Sublime

Left to Their Own Devices - Albright (Chapter 7)

Videogames and the Digital Sublime - Shinkle

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

Week 8

M - Cultural Perspectives

The Environmental History of the Soviet Union - Brain

Which Rights are Right? Water Rights, Culture, and Underlying Values - Pradham and Meinen-Dick

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

Case Studies

Week 9

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

Hopi Tribal Council Bans Environmental Groups - Navajo-Hopi Observer

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

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

Spring Break

Week 10

M - Biofuels

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

Consuming Power - Nye (Chapters 7, 8, and 9)

W - The Smart Grid: Demand Response Technologies

*An Informatics Approach to Demand Response Optimization in
Smart Grids* - Simmhan

The Grid: Biography of an American Technology - Cohn

Project Proposal Due

Week 11

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

Owens Valley Water History 101 - James www.thereitistakeit.org
Lake Lazarus: Rewilding the US West - Maxmen (Nature, 15 November 2018)

www.thereitistakeit.org (Audio tour tracks of the Owen's Valley)
Intake - Los Angeles Aqueduct Centennial Edition
<http://www.laaqueduct100.com/wp-content/uploads/LAA100Issue.pdf>

W - Toilet to Tap: Recycling Water for Los Angeles

*Domestic Wastewater Recycling: "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 - Riparian Treasure or Concrete-Shackled Menace: The Los Angeles River

Who Killed the Los Angeles River - Gumprecht

The Los Angeles River: Its Life, Death, and Possible Rebirth
- Gumprecht (Chapters 1 - 5)
www.lariver.org (Revitalization Plan - Reference)

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

*San Joaquin Valley, California: Largest Human Alteration of the
Earth's Surface* - Galloway
Endangered Species and the Politics of Place in California - Alagona
(Chapter 8 - *The Delta Smelt: Politics by Another Name*)

Week 13

M - Communicating (The Internet and Digital Infrastructure)

A Policy-Maker's Guide to Digital Infrastructure - Atkinson et al.

How the Internet Happened - McCullough

W - Coming Untethered

Left to Their Own Devices - Albright (Chapters 1 and 2)

Week 14

M - The Post-Industrial Workforce, Surveillance Societies and the Connected World

W - Wrap Up. Infrastructure Challenges in an Untethered World

Left to Their Own Devices - Albright (Chapters 8 and 12)

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.