Transportation and Environmental Issues

Urban Planning 258 / Public Policy 223

Winter 2022 Syllabus

Instructor
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Office hours: Weds 10-12
Sign up here: https://goo.gl/X7vFOD

Schedule and Location
Tues/Thurs 9.30-10.45am
Public Affairs 2343

Course Description

Transportation is the largest contributor to California's greenhouse gas emissions, and the fastest growing source of emissions worldwide. In this course, we will critically analyze a range of policies to improve fuel economy, promote electric vehicles, and reduce vehicle travel. We will examine the history and legal frameworks of environmental regulation, and consider analytical methods to quantify carbon emissions and estimate emission reductions. We will focus on climate change, but also consider other environmental consequences of transportation, from air pollution to stormwater runoff.

I acknowledge our presence on the traditional, ancestral and unceded territory of the Gabrielino/Tongva peoples.

Course Goals

After completing this course, you should be able to:

- Identify and critically analyze ways in which policymakers and planners can manage the environmental impacts of transportation
- Conceptualize, analyze, and quantify the net impacts of a transportation project, particularly for carbon
- Critically analyze how racial and other societal injustices are affected by the design of environmental and transportation policies
- Understand the legal and policy frameworks for mitigating transportation emissions, at scales from local to global

Course Tools

All the readings, recordings, and assignments will be posted on **Bruin Learn** (Canvas).

We will primarily use **Slack** to maintain communication outside of scheduled class times. In particular, it provides a space for discussion of the readings. You'll receive an email invitation from me to join our Slack workspace. If you are not familiar with Slack, please familiarize yourself with the tool using the resources here: https://www.it.ucla.edu/support-training/tutorials/how-use-slack.

Class Participation

Class sessions will usually include a mixture of lecture and discussion, and your active participation is essential to making this course successful and enjoyable.

To help seed the discussion, all students should post to Slack 1-3 brief discussion questions and/or comments on the readings for that class. These are due at 9AM the day of class. Your post might include a question that was sparked by one of the readings, a broad comment on or reaction to the readings, or an example that further illustrates a concept from the readings. These posts have three purposes: (i) encouraging you to engage actively with the readings, (ii) helping us all appreciate different perspectives on the course material; and (iii) helping me shape the structure of each class. Please engage with the posts of others as well as writing your own – this is a discussion board, not a repository of essays.

Graded Assignments

Detailed instructions and grading criteria will be distributed early in the quarter.

Carbon analysis (draft)	5%	Due: Feb 16, 5PM
Carbon analysis (final)	20%	Due: Mar 4, 5PM
Case study	15%	Sign up for a slot
Take-home final exam	35%	Finals week
Homework problems	10%	
Class participation (on Slack and in class)	15%	

Carbon analysis

In the course, we will introduce a range of tools to quantify the environmental impacts (principally carbon) of transportation projects. Working in pairs, you will apply these methods to a project of your choosing, and produce an analysis of its climate change benefits (or harms). For example, how can you estimate the greenhouse gas impacts of a scooter program, or a Bus Rapid Transit project? You'll submit a complete draft of your analysis for peer review, as well as a final version.

Case study

Working in pairs, you will develop a case study of policy development and implementation in a particular city or other place. The aim is to take some of the general, possibly abstract, policies that we discuss in the class, and analyze them in a specific context. For example, how has a particular city planned for vehicle electrification or transportation justice?

This is an oral assignment – there is no written deliverable (except for any slides, if you use them). You will give a 5-minute presentation in class (plus some time for questions), which can be live or pre-recorded. Your presentation should discuss the specific practices, policies or projects that other places can learn from and emulate, and analyze the important lessons learned.

Choose a case study from the approved list, or suggest your own to the instructor. Sign up during the first week of the class for a case study and presentation slot.

Take-Home Final

The final exam will be distributed on Monday of finals week, and be due one week later. It should take you about 2 hours if you have studied extensively beforehand.

Homework Problems

There will be 2-3 quantitative problem sets, distributed as we cover the relevant material. The problems will involve simple spreadsheet analysis of fuel economy, carbon accounting, and similar issues.

Class Participation

Your class participation grade will consider active participation in class, the quality of your written comments on the readings for each class, and the peer review that you give on the Carbon Analysis assignment. Attendance will not directly count towards your grade – please stay home if you are sick! However, I ask you to commit to attending all the classes that you physically can.

Course Policies

Accessibility and Disabilities

If you require any accommodations because of a disability, please talk to me within the first two weeks of the quarter if possible. The sooner that I am aware of any accessibility needs, the quicker I can try and accommodate them.

Late Submission of Assignments

Students can make a formal request to the instructor for special consideration for an extension to an assignment due date. This request should be received at least 48 hours in advance. Otherwise, **one partial grade** will be deducted for every 24-hour period an assignment is late. For example, an A- will go to a B+.

Academic Integrity

UCLA's policy about plagiarism is clear: the sources of all ideas, text, pictures, or graphics that are not your (or your team's) own must be fully cited, all passages copied from other sources must be in quotation marks with the source cited, and you absolutely cannot submit materials that have previously been submitted by other students in previous iterations of this course, even if you have re-worked this material for your submission. Being in this class constitutes an acknowledgment and willingness to abide by UCLA's academic integrity policies.[1] Should you have any questions about these policies, go to: http://www.studentgroups.ucla.edu/dos/students/integrity/.

[1] Thank you to Prof. Michael Manville for permission to use this text.

Course Schedule and Readings

The schedule is preliminary and subject to change, depending on how quickly or slowly we move through the material, which is not always easy to predict. I will attach specific dates to each reading in Bruin Learn, closer to the time. While not required, please try and skim some of the optional readings, which provide more extensive context, analytical tools, or different perspectives.

For most of the readings, I provide guiding questions on Bruin Learn. I realize that it's not always clear why I am assigning a particular reading, nor what I want you to focus on or get out of it. The guiding questions are not intended to be exhaustive, but rather to help you in the reading process.

January 4, 6: Introduction

We will introduce some of the key environmental challenges posed by transportation, and consider different ways in which the problems have been conceptualized and framed.

Required Readings

Barth, Matthew, and Daniel Sperling. 2019. "Environmentally Sustainable Transportation." Ch 14 in *Bending the Curve. Climate Change Solutions*, edited by V. Ramanathan, A. Millard-Ball, and M. Niemann. Oakland: California Digital Library. https://bit.ly/2k27qqy

Axsen, Jonn, Patrick Plötz, and Michael Wolinetz. 2020. "Crafting Strong, Integrated Policy Mixes for Deep CO_2 Mitigation in Road Transport." *Nature Climate Change* 10(9):809–18.

Energy Information Administration. 2021. *Annual Energy Outlook. Transportation.* https://www.eia.gov/outlooks/aeo/pdf/05%20AEO2021%20Transportation.pdf

Optional Readings

Wachs, Martin. 2010. "Transportation Policy, Poverty, and Sustainability: History and Future," The Thomas B. Deen Distinguished Lecture, *Transportation Research Record: The Journal of the Transportation Research Board*, 2163, pp. 3-12.

Banister, David, Karen Anderton, David Bonilla, Moshe Givoni, and Tim Schwanen. 2011. "Transportation and the Environment." *Annual Review of Environment and Resources* 36(1), pp. 247-70.

Sims, R., R. Schaeffer, F. Creutzig, X. Cruz-Núñez, M. D'Agosto, D. Dimitriu, M. J. Meza Figueroa, L. Fulton, S. Kobayashi, O. Lah, A. McKinnon, P. Newman, M. Ouyang, J. J. Schauer, D. Sperling, and G. Tiwari. 2014. "Transport." in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by Ottmar Edenhofer et al. Cambridge: Cambridge University Press.

PART 1: LAWS AND POLICIES

January 13, 18: From manure to smog to climate

We'll examine the history and roots of transportation's environmental impacts, and how they have evolved over the years—from horse manure, to smog, to climate change. The first class will focus on the national level, and the second class on California's climate policies.

Note: Class on January 11 will be asynchronous (a pre-recorded lecture)

Required Readings

Yarne, Michael R. 2000. Conformity as catalyst: Environmental Defense Fund v. Environmental Protection Agency. *Ecology Law Quarterly*, 27(3), 841-884.

Millard-Ball, Adam, and Daniel Press. 2019. "Lessons from California." Ch 9 in *Bending the Curve. Climate Change Solutions*, edited by V. Ramanathan, A. Millard-Ball, and M. Niemann. Oakland: California Digital Library. https://bit.ly/2k27qqy

Evans-Brown, Sam. 2020. "How Massachusetts v. EPA Forced the U.S. Government to Take On Climate Change." *Inside Climate News*, June 4, 2020. https://insideclimatenews.org/news/04062020/massachusetts-v-epa-emissions-pollution-climate-change

Osaka, Shannon. 2020. "Trump gutted environmental protections. How quickly can Biden restore them?" *Salon*, November 22, 2020. https://www.salon.com/2020/11/21/trump-gutted-environmental-protections-how-quickly-can-biden-restore-them_partner/

Optional Readings

Morris, Eric. 2007. "From Horse Power to Horsepower," *Access* 30, pp. 2-9.

Garrett, Mark, and Martin Wachs. 1996. *Transportation Planning on Trial: The Clean Air Act and Travel Forecasting*. Thousand Oaks, Calif.: Sage Publications. Chapter 1.

California Air Resources Board. 2018. *2018 Progress Report. California's Sustainable Communities and Climate Protection Act.*

Barbour, Elisa. 2016. "Evaluating Sustainability Planning Under California's Senate Bill 375." Transportation Research Record: Journal of the Transportation Research Board 2568: 17-25.

January 20, 25: Efficient vehicles

We'll briefly discuss what technologies are available to improve fuel efficiency, but focus on the regulations and policies, particularly fuel economy standards, that promote their uptake.

Required Readings

ICCT. 2017. *US passenger vehicle CAFE and GHG regulations: The basics.* https://theicct.org/cards/stack/us-passenger-vehicle-cafe-and-ghg-regulations-basics

Jacobsen, Mark. 2019. "Cost-effective climate policies." Ch 12 in *Bending the Curve. Climate Change Solutions*, edited by V. Ramanathan, A. Millard-Ball, and M. Niemann. Oakland: California Digital Library. https://bit.ly/2k27qqy. Focus on Section 12.4.

Bento, Antonio et al. 2018. "Flawed analyses of U.S. auto fuel economy standards," *Science* 362(6419), pp. 1119-1121.

Optional Readings

Anderson, S. T., I. W. H. Parry, J. M. Sallee, and C. Fischer. 2011. "Automobile Fuel Economy Standards: Impacts, Efficiency, and Alternatives." *Review of Environmental Economics and Policy* 5(1): 89–108.

January 27, February 1: Zero-emission vehicles

Are electric vehicles and other zero-emission vehicles the solution? We'll discuss technologies and policy options at the federal, state, and local levels.

Required Readings

McConnell, Virginia and Leard, Benjamin. 2021. "Pushing New Technology into the Market: California's Zero Emissions Vehicle Mandate," *Review of Environmental Economics and Policy* 15(1), pp. 169-179.

The Economist. 2020. "Outright bans can sometimes be a good way to fight climate change," *The Economist*, October 3, 2020. https://www.economist.com/finance-and-economics/2020/10/03/outright-bans-can-sometimes-be-a-good-way-to-fight-climate-change

Wappelhorst, Sandra and Cui, Hongyang. 2020. "Growing momentum: Global overview of government targets for phasing out sales of new internal combustion engine vehicles." *ICCT Blog.* https://theicct.org/blog/staff/global-ice-phaseout-nov2020 and update at https://theicct.org/publications/update-govt-targets-ice-phaseouts-jun2021

Mulkern, Anne. 2020. "Los Angeles Accelerates Efforts to Electrify Its Infamous Traffic." *Scientific American*, July 30, 2020. https://www.scientificamerican.com/article/los-angeles-accelerates-efforts-to-electrify-its-infamous-traffic/

Optional Readings

DeShazo, J.R. 2016. "Improving Incentives for Clean Vehicle Purchases in the United States: Challenges and Opportunities," *Review of Environmental Economics and Policy* 10(1), pp. 149-165.

PART 2: TOOLS

February 3, 8, 10, 15: Counting Carbon

How can transportation's climate impacts best be quantified? We'll discuss some of the overall approaches and key concepts. We'll then focus on three specific issues: analyzing public transit's contribution towards greenhouse gas reduction; estimating the contribution of a specific project, whether a bike share program or streetcar, to greenhouse gas emission reductions; and Life Cycle Analysis (LCA).

Required Readings

WRI n.d. *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories.* https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

Squires, Camille. 2021. "Are Cities Underestimating Carbon Pollution?" *CityLab*, March 26. https://www.bloomberg.com/news/articles/2021-03-26/how-to-tell-if-cities-are-underestimating-emissions

DeShazo, J. R., and Juan Matute. 2012. "The Local Regulation of Climate Change." Ch 23 in *Oxford Handbook of Urban Planning*, edited by R. Weber and R. Crane. New York: Oxford University Press.

McGraw, Jen; Haas, Peter; Ewing, Reid; and Sabouri, Sadegh. 2021. *An Update on Public Transportation's Impacts on Greenhouse Gas Emissions*. TCRP Synthesis Report.

Ríos, Ramiro Alberto; Arango, Francisco; Vicentini, Vera Lucia; and Acevedo-Daunas, Rafael. 2013. Mitigation Strategies and Accounting Methods for Greenhouse Gas from Transportation. New York: Inter-American Development Bank.

Nahlik, Matthew and Chester, Mikhail. 2015. "Life-Cycle Impacts of Transit-Oriented Development," *Access* 47, pp. 22-27.

Skim the Nahlik and Chester technical analysis:
https://www.sciencedirect.com/science/article/abs/pii/S0967070X14001036

International Transport Forum. 2020. "Good to Go? Assessing the Environmental Performance of New Mobility." https://www.itf-oecd.org/good-to-go-environmental-performance-new-mobility

Optional Readings

Millard-Ball, Adam, and Leonard Ortolano. 2010. "Constructing Carbon Offsets: The Obstacles to Quantifying Emission Reductions." *Energy Policy* 38(1):533–46.

February 17: CEQA and transportation

Is the California Environmental Quality Act a help or hindrance for sustainable transportation? We'll focus particularly on recent changes, such as the move from Level of Service to vehicle travel metrics.

Required Readings

https://www.sb743.org/. Focus on the introduction and the case studies.

Barbour, Elisa; Chatman, Daniel; Doggett, Sarah; Yip, Stella; and Santana, Manuel. 2019. *SB 743 Implementation: Challenges and Opportunities.* UC Berkeley ITS report.
https://escholarship.org/uc/item/4gj3n2n3

Optional Readings

Nguyen, Jessica and Tina Yuen. 2019. *How Measuring Vehicle Miles Traveled Can Promote Health Equity.* https://www.changelabsolutions.org/product/measuring-vmt-promotes-health-equity. Changelab Solutions.

PART 3: THEMES

February 22, 24: Environmental injustices

Environmental justice is a continuous theme throughout the course, but here we will focus on questions of inequity and environmental racism more explicitly. We'll look at both tools to quantify environmental justice, and policy approaches.

Required Readings

Schweitzer, Lisa, and Abel Valenzuela. 2004. "Environmental Injustice and Transportation: The Claims and the Evidence." *Journal of Planning Literature* 18(4):383–98.

Karner, Alex; Golub, Aaron; Martens, Karel; and Robinson, Glenn. 2018. "Transportation and Environmental Justice: History and Emerging Practice." Ch 32 in *Routledge Handbook of Environmental Justice*, edited by Ryan Holifield, Jayajit Chakraborty, and Gordon Walker. Routledge.

Optional Readings

Tayarani, Mohammad, Amir Poorfakhraei, Razieh Nadafianshahamabadi, and Gregory M. Rowangould. 2016. "Evaluating Unintended Outcomes of Regional Smart-Growth Strategies: Environmental Justice and Public Health Concerns." *Transportation Research Part D: Transport and Environment* 49:280–90.

TCRP 2020, Equity Analysis in Regional Transportation Planning Processes. TCRP Report 214.

March 1: Air travel

Cars, buses, and trains can (relatively) easily shift to electric propulsion. Aircraft are a different story. We'll examine the climate change impacts of aviation, and policy options to reduce emissions from this fast-growing source.

Required Readings

Irfan, Umair. 2019. "Air travel is a huge contributor to climate change. A new global movement wants you to be ashamed to fly." *Vox*, November 30, 2019. https://www.vox.com/the-highlight/2019/7/25/8881364/greta-thunberg-climate-change-flying-airline

Rutherford, Dan. 2020. Standards to promote airline fuel efficiency. ICCT Briefing. https://theicct.org/sites/default/files/publications/Airline-fuel-efficiency-standard-2020.pdf

March 3, 8: A global perspective

How is transportation considered in global climate and energy models, and in international climate negotiations? We'll discuss the global policy framework, particularly in terms of individual countries' proposals under the Paris Agreement.

Required Readings

Li, Shanjun, Jianwei Xing, Lin Yang, and Fan Zhang. 2020. "Transportation and the Environment in Developing Countries." *Annual Review of Resource Economics* 12: 389-409.

Fransen, Taryn, Ben Welle, Camron Gorguinpour, Margaret McCall, Ranping Song and Alexander Tankou. 2019. *Enhancing NDCs. Opportunities in Transport*. World Resources Institute. https://www.wri.org/publication/enhancing-ndcs-opportunities-transport

Optional Readings

Creutzig, Felix. 2016. "Evolving Narratives of Low-Carbon Futures in Transportation," *Transport Reviews* 36(33), pp. 341-360.

March 10: The future

We'll discuss what the future might hold, with particular reference to the Biden administration's unfolding plans for transportation, environmental justice, and the Green New Deal.

Required Readings

TBD