Sustainability Metrics: SUMA PS5169

Columbia University

Instructor

Adam Freed

Course Description

Over the past two decades, public and private institutions have set clear targets for environmental, economic, and social performance and they are increasingly using analytical tools to assess problems and measure progress. The advent of "Big Data" has accelerated this work – and opened up new possibilities and challenges. This course will examine the use of data and metrics to shape and implement sustainability policies and programs, and to assess and communicate their outcomes.

The course will survey a range of real world sustainability challenges and evaluate the choices confronting public officials, private companies, NGO's, advocates, and citizens – and the data that can be used to diagnose problems, develop solutions, and measure success. Particular focus will be given to urban sustainability efforts and corporate sustainability. We will explore how data can be used and misused in each of these domains. Throughout we will emphasize the importance of context, comparability, and completeness of information.

Students will be required to critically evaluate what they read and hear. In addition, the course will give students an opportunity to learn how to express their ideas verbally and in written form and conduct critical analysis of how environmental data is used to develop and implement public policy. Assignments will give students the opportunity to use their technical and analytical skills while understanding the real world applications that will be important to their future work as planners, policymakers, advocates, architects, environmentalists or other professions.

The course will feature guest lectures from speakers who are leaders in their fields. Lecture topics may be moved to accommodate speaker travel and availability. Notice will be provided to students in advance of any schedule changes.

This course satisfies the M.S. in Sustainability Management's quantitative analysis requirement.

Course Objectives

What do we want students to **know** and or **value** at the end of the course?	Through the readings, lectures, in-class discussions, assignments and guest speakers, students will gain an understanding of how data can be used to identify the root causes of sustainability challenges, create targeted strategies to address them, engage stakeholders and build political coalitions, and track and communicate progress. Students will gain the skills to develop clear metrics and programmatic goals and critically evaluate the goals and measurements used by others. At the end of the course, students will understand how data can be used and misused, its power and shortcomings in communicating complex sustainability issues, and how to use data and analysis to solve complicated sustainability challenges.

What will students be able to **do** at the end of the course?	By the end of this course students should be able to: • Understand the use and development of metrics at the city, national, and corporate levels to track progress toward sustainability goals • Evaluate the transparency and effectiveness of sustainability programs • Analyze and evaluate demographic, environmental, operational, and performance data to develop sustainability indicators • Understand that addressing complex environmental challenges involves making trade-offs and that choices are made based on the perspective and interests of the decision-makers
What "big" questions/issues are dealt with in the course?	• How do you define and measure complex issues like sustainability and resilience? • What makes a city or corporation "sustainable"? • What is the role of data in program development and management? • How do you identify the trade-offs in policy decisions and gather and use data to make more informed decisions?
How do these "big" questions/issues inform our teaching and assessment approach?	The class will provide a set of fundamental skills that students may apply in professional settings, with an emphasis on developing an analytic framework for sustainability and developing and monitoring solutions. The professor and guest lecturers will draw on their professional experiences to ground all topics and discussions in "real world" examples that go beyond academic studies.

Course Schedule

PART I. INTRODUCTION TO MEASUREMENT AND METRICS

- Week 1 (Sept. 11): Sustainability Metrics Overview
- Week 2 (Sept 18): Greenhouse Gas Emissions
- Week 3 (Sept. 25): Water
- Week 4 (Oct 2): Solid Waste
- Week 5 (Oct.9): Climate Resilience
- Week 6 (Oct 16): Mobility
- Week 7 (Oct. 23): Air Quality
- Week 8 (Oct 30): Food Systems

**** Class will not be held on Nov. 6 due to the Academic Holiday ****

PART II. HOW DO ALL OF THESE EFFORTS ADD UP?

- Week 9 (Nov. 13): Corporate Sustainability
- Week 10 (Nov. 20): Equity and Prosperity
- Week 11 (Nov. 27): Urban Sustainability
- Week 12 (Dec. 4): Wrap up discussion and presentations
- Week 13 (Dec 11): Presentations

Readings

A textbook will not be required for this course, although some articles and case studies may require purchase from online resources such as Harvard Business School Case Studies. All readings are listed in the Course Schedule section of this syllabus and will be posted to Courseworks.

"Required" readings are to be read BEFORE coming to class. "Supplemental" readings will also be provided throughout the class. While they are not required, they will provide additional information that will enhance your knowledge of the course subject matter.

Course Requirements (Assignments and grading)

- **Metric memo (10%)** - In April 2017, Columbia University rereleased its first sustainability plan, in which the University pledged to cut its greenhouse gas emissions 35% by 2020 and 80% by 2050. Students will write a 1,000 to 1,500 word memo recommending a non-GHG sustainability goal for Columbia. Memos must include:
    - a clear and measurable goal for 2030
    - a persuasive argument as to why your goal is important and material for Columbia
    - a pressure, state, and response indicator (3 in total) to track progress toward your goal.
- **Case study (20%)** - Students will individually complete a case write-up, which are expected to be 2-3 pages and will be discussed in class on the date they are due. Specific questions to be answered will be provided in class
- **Problem set (20%)** - Students will be provided with a problem set and relevant information/sources to quantify the economic, social and environmental costs and benefits of a specified sustainability solution and will be asked to recommend an optimal implementation strategy weighing the relative costs and benefits. Students should individually complete the problem sets.
- **Final project (35%)** - Students will work as teams to propose a set of sustainability goals and indicators for a specific corporation (to be approved by the instructor) or for the City of Detroit. Each project team will present their initial recommendations in class on Dec 4 and Dec 11, with an accompanying paper no longer than 8-10 pages due on Dec 18. Presentations should be no longer than 15 minutes and will be followed by 5 minutes of Q&A.
- **Class participation (15%)** - Class participation will be evaluated on a scale of 100-0. All students are expected to contribute to the classroom discussion throughout the course, including the in-class presentations and discussions with guest speakers. While classes will generally feature lectures on the specified topics each week, active discussion is encouraged to bring in students' experiences and knowledge. Students should probe concepts introduced in the class and in readings and look for innovative solutions to challenges identified in the materials.

  On-time attendance at each class meeting is expected. Partial attendance, i.e. lateness or early departure, if not excused in advance, will impact the "Participation" component of the course grade. If you need to miss a class for any reason, please email the instructors in advance.

Course Policies

Participation and Attendance
You are expected to do all assigned readings, attend all class sessions, and engage with others in class discussions. If you need to miss a class for any reason, please discuss the absence with the instructors in advance.

Late work
Papers and projects are due by the beginning of class on the date that they are due. All assignments must be handed in on time. Any late submissions, unless pre-approved by the professor, will receive an automatic reduction of one letter grade.

Resources
- GHG Protocol Calculation Tools - http://www.ghgprotocol.org/calculation-tools/faq
- Environmental Performance Index - http://epi.yale.edu/
- Moonen, Tim and Greg Clark, "The Business of Cities 2013" Jones Lang LaSalle, 2013. - http://www.jll.com/Research/jll-city-indices-november-2013.pdf
- STAR Communities Index - http://www.starcommunities.org/
- C40 Cities Climate Leadership Group - http://www.c40.org/
- Social Vulnerability Index - http://artsandsciences.sc.edu/geog/hvri/sovi%C2%AE-0

- US EPA Green Communities - https://www.epa.gov/smartgrowth/tools-and-resources-sustainable-communities
- Pivot Goals - http://www.pivotgoals.com/
- CDP - https://www.cdp.net/en-US/Pages/HomePage.aspx
- Global Reporting Initiative - https://www.globalreporting.org/Pages/default.aspx
- Dow Jones Sustainability Index - http://www.sustainability-indices.com/
- National Equity Atlas – http://www.nationalequityatlas.org

School Policies

Copyright Policy
Please note -- Due to copyright restrictions, online access to this material is limited to instructors and students currently registered for this course. Please be advised that by clicking the link to the electronic materials in this course, you have read and accept the following: The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

Academic Integrity
Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times. SCE holds each member of its community responsible for understanding and abiding by the SCE Academic Integrity and Community Standards posted at http://sps.columbia.edu/student-life-and-alumni-relations/academic-integrity-and-community-standards.

You are required to read these standards within the first few days of class. Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings.

Accessibility
Columbia is committed to providing equal access to qualified students with documented disabilities. A student’s disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: http://health.columbia.edu/services/ods/support.

Readings

PART I. INTRODUCTION TO MEASUREMENT AND METRICS

Week 1: Sustainability Metrics Overview (September 11)

Required Readings:

- Sachs, Jeffery, "Why the Sustainable Development Goals Matter." Project Syndicate, March 30, 2015. Available at http://www.project-syndicate.org/commentary/sustainable-development-goals-shift-by-jeffrey-d-sachs-2015-03
- McArthur, John, "Own the Goals: What the Millennium Development Goals Have Accomplished." Brookings Institute, February 21, 2013. Available at https://www.brookings.edu/articles/own-the-goals-what-the-millennium-development-goals-have-accomplished/
- United Nations, "The Millennium Development Goals Report 2015". 2015 (pages 4-13, 52-61, and page 70). Available at http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf
- Hardi, Peter and Terrence Zdan, "Assessing Sustainable Development: Principles in Practice." The International Institute for Sustainable Development, 1997 (pages 1-23). Accessible at https://www.iisd.org/pdf/bellagio.pdf
- "Balanced Scorecard Basics." Balanced Scorecard Institute website. Accessible at http://balancedscorecard.org/Resources/About-the-Balanced-Scorecard
- City of New York, "PlaNYC Update 2011," 2011 (pages 3-17 and 178-179). Available at http://www.nyc.gov/html/planyc/downloads/pdf/publications/planyc_2011_planyc_full_report.pdf

Supplemental Readings:

- Rohm, Howard and Dan Montgomery, "Link Sustainability to Corporate Strategy Using the Balanced Scorecard." Balanced Scorecard Institute. Available at http://balancedscorecard.org/Portals/0/PDF/LinkingSustainabilitytoCorporateStrategyUsingtheBalancedScorecard.pdf
- United Nations, "Report of the World Commission on Environment and Development: Our Common Future." 1987. Available at http://www.un-documents.net/our-common-future.pdf
- United Nations, "Agenda 21." UN Conference on Environment & Development, June 1992.
- UN Millennium Goals Indicators website - http://mdgs.un.org/unsd/mdg/Default.aspx
- UN Sustainable Development Goals - http://www.un.org/sustainabledevelopment/sustainable-development-goals/

Week 2: Greenhouse Gas Emissions (September 18)

*** Metric memo due at the beginning of class ***

Required Readings:

- Global Protocol for Community Scale Greenhouse Gas Inventories Executive Summary. Available at http://www.ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities
- City of New York, "Inventory of New York City's Greenhouse Gas Emissions." April 2016, by Cventure LLC, Cathy Pasion, Mikael Amar, and Yun Zhou, Mayor's Office of Sustainability, New York, 2016. Available at https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/NYC_GHG_Inventory_2014.pdf
- City of Oakland, "2016 Greenhouse Gas Emissions Inventory Report." City of Oakland, March 2016. (pages 1-11) Available at http://www2.oaklandnet.com/oakca1/groups/pwa/documents/report/oak059097.pdf
- World Resources Institute and World Business Council for Sustainable Development, "Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition." WRI, 2015. (pages 6-33) Available at http://www.ghgprotocol.org/corporate-standard

- Barrett, Brendan F.D. and Andrew DeWit, “This is why we cannot rely on cities alone to tackle climate change.” The Conversation, September 3, 2017. Accessible at https://theconversation.com/this-is-why-we-cannot-rely-on-cities-alone-to-tackle-climate-change-82375

Supplemental Readings:

- City of New York, “New York City’s Roadmap to 80x50.” City of New York, New York, 2016. Accessible at http://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City's%20Roadmap%20to%2080%20x%2050_20160926_FOR%20WEB.pdf
- IPCC, “Summary for Policymakers. Climate Change 2014, Mitigation of Climate Change.” Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 2014. Available at https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf
- Stanton, E.A, Bueno, R., Cegan, J, and Munitz, C., “Consumption-Based Emissions Inventory for San Francisco: Technical Report.” Somerville, MA: Stockholm Environment Institute-U.S. Center. (pages 6-29) Available at http://www.sfenvironment.org/sites/default/files/fliers/files/sf_consumption_based_emissions_inventory.pdf
- World Resources Institute, “Sample Corporate Standard Reporting Template.” Available at http://www.ghgprotocol.org/sites/default/files/ghgp/standards_supporting/GHG-Protocol-Reporting-Template.docx

Week 3: Water (September 25)

Required Readings:

- McDonald, R.I and D. Shemie, “Urban Water Blueprint: Mapping conservation solutions to the global water challenge.” 2014, The Nature Conservancy, Washington, D.C. Available at http://water.nature.org/waterblueprint/////about.html
- 2030 Water Resources Group, “Charting Our Water Future: Economic Frameworks to Inform Decision-Making.” 2009 (just the Executive Summary, Introduction). Available at http://www.mckinsey.com/client_service/sustainability/latest_thinking/charting_our_water_future
- Asian Development Bank, “Asian Water Development Outlook 2013.” ADB, 2013. (Part 1only) Available at https://www.adb.org/sites/default/files/publication/30190/asian-water-development-outlook-2013.pdf
- Coca-Cola Replenishment Report (website). (skim) Available at http://www.coca-colacompany.com/water-stewardship-replenish-report/
- Winston, Andrew, “Coca-Cola Met Its Water Goals Early. Were They Too Easy?” Harvard Business Review, September 9, 2015. Available at https://hbr.org/2015/09/coca-cola-met-its-water-goals-early-were-they-too-easy
- Arcadis, “Sustainable Cities Water Index.” Arcadis, 2016. Available at https://www.arcadis.com/media/4/6/2/%7B462EFA0A-4278-49DF-9943-C067182CA682%7DArcadis_Sustainable_Cities_Water_Index-Web.pdf

Supplemental Readings:

- Robert I. McDonald, et al, “Water on an urban planet: Urbanization and the reach of urban water infrastructure,” Global Environmental Change, July 2014. http://www.sciencedirect.com/science/article/pii/S0959378014000880
- World Resource Institute, “Aqueduct Water Risk Framework.” WRI, Washington, DC, 2013. Available at http://www.wri.org/sites/default/files/aqueduct_water_risk_framework.pdf
- World Resource Institute’s “Aqueduct Water Risk Mapping Tool”: http://aqueduct.wri.org/
- United Nations, “The United Nations World Water Development Report 2015.” United Nations Educational Scientific and Cultural Organization, 2015. Available at http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2015-water-for-a-sustainable-world/

- Brown, Amber and Marty D. Matlock, “A Review of Water Scarcity Indices and Methodologies.” University of Arkansas, The Sustainability Consortium, White Paper #106, April 2011. Available at https://www.sustainabilityconsortium.org/downloads/a-review-of-water-scarcity-indices-and-methodologies/
- City of New York, “Filtration Avoidance Annual Report.” Department of Environmental Protection, March 2015. Available at http://www.nyc.gov/html/dep/pdf/reports/fad_11._reporting_-_2014_fad_annual_report_03-15.pdf
- The Coca-Cola Companies, “Quantifying Replenish Benefits in Community Water Partnership Projects.” 2013. Available at http://assets.coca-colacompany.com/2f/cb/e5d2ca1e4c58a38adbe8586d06db/final-quanitification-report-water-pdf.pdf
- CDP, “Cities and Water infographic.” CDP, Washington, DC, 2017. Accessible at https://www.cdp.net/en/research/global-reports/cities-infographic-2017

Week 4: Solid Waste (October 2)

*** Case study due at the beginning of class and will be discussed for the first 45 minutes of class. ***

The case study, “Patagonia's Sustainability Strategy: Don't Buy Our Products**,”** can be downloaded at https://hbr.org/product/patagonia-s-sustainability-strategy-don-t-buy-our-products/IMD790-PDF-ENG

- New York City Department of Sanitation, “2013 NYC Curbside Waste Characterization Study.” City of New York, New York, NY, 2013. Accessible at http://www1.nyc.gov/assets/dsny/about/inside-dsny/waste-characterization-2013.shtml
- General Motors, “The Business Case for Zero Waste.” General Motors, Detroit, MI. Accessible at http://www.gm.com/content/dam/gm/en_us/english/Group3/sustainability/sustainabilitypdf/GMs_Landfill-free_Blueprint.pdf
- Waste Management, “Leading Change: 2016 Sustainability Report.” Waste Management, 2016. Accessible at http://www.wm.com/sustainability/pdfs/2016SustainabilityReport_WM.pdf (pages 5-48)
- Engel, Hauke; Stuchtey, Martin; and Vanthournout, Helga, “Managing waste in emerging markets.” McKinsey and Company, New York, NY, February 2016. Accessible at http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/managing-waste-in-emerging-markets
- McKinsey and Company, “Mapping the benefits of a circular economy” McKinsey Quarterly, New York, NY, June 2017. Available at http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/mapping-the-benefits-of-a-circular-economy

Week 5: Climate Resilience (October 9)

Required Readings:

- S. Kreft, D. Eckstein, L. Junghans, C. Kerestan and U. Hagen, “Global Climate Risk Index 2015: Who Suffers Most From Extreme Weather Events? Weather-related Loss Events in 2013 and 1994 to 2013.” German Watch Institute, 2013. Available at https://germanwatch.org/en/download/10333.pdf
- Da Silva, Jo, “City Resilience Index.” Arup International Development and Rockefeller Foundation, 2015. Available at http://www.arup.com/city_resilience_index
- Economics of Climate Adaptation Working Group, “Shaping Climate-Resilient Development: A Framework for Decision-Making.” 2009 (pages 1-33). Available at http://mckinseyonsociety.com/downloads/reports/Economic-Development/ECA%20%20%20Shaping%20Climate%20Resilent%20Development%20%20%20Report%20Only.pdf
- City of New York, “A Stronger, More Resilient New York,” City of New York, 2013 (Climate Analysis Chapter, pages 33-36 only). Available at http://s-media.nyc.gov/agencies/sirr/SIRR_singles_Lo_res.pdf

- Stephen Tyler, Erwin Nugraha, Ha Kim Nguyen, et al., "Climate Resilience Working Paper # 2: Developing Indicators of Urban Climate Resilience." Institute for Social and Environmental Transition, Jan. 2014. Available at http://i-s-e-t.org/resources/working-papers/wp2-climate-resilience.html

Supplemental Readings:

- World Economic Forum, "A Vision for Managing Natural Disaster Risk: Proposals for Public/Private Stakeholder Solutions." January 2011. Available at https://www.weforum.org/reports/vision-managing-natural-disaster-risk
- Alliance Development Works, "World Risk Report 2013." Alliance Development Works, 2013. Available at https://i.unu.edu/media/ehs.unu.edu/news/4070/11895.pdf
- MunichRe, "Megacities - Megarisks Trends and Challenges for Insurance and Risk Management." Münchener Rückversicherungs-Gesellschaft, 2004. Available at http://www.preventionweb.net/files/646_10363.pdf

Week 6: Mobility (October 16)

- City of New York, "Vision Zero Action Plan." 2014. http://www.nyc.gov/html/visionzero/pdf/nyc-vision-zero-action-plan.pdf
- City of Los Angeles, "Great Streets for Los Angeles." City of LA, 2014. Available at http://www.smartgrowthamerica.org/documents/cs/impl/ca-losangeles-dot-strategicplan2014.pdf
- NYC Department of Transportation, "Measuring the Street: New Metrics for 21st Century Streets." City of New York 2012. Available at http://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf
- National Association of City Transportation Officials, "NACTO Policy 2017: Creating Safe, Sustainable, Multi-Modal Urban Transportation." NACTO, New York, NY, 2017. Accessible at https://nacto.org/wp-content/uploads/2017/03/NACTO-Policy-2017.pdf
- McCahill, Chris and Mary Ebeling, "Tools for measuring accessibility in an equity framework." Congress for the New Urbanism, 2015. Available at http://www.cnu.org/sites/default/files/ssti_transpo_equity.pdf
- Goldsmith, Stephen, "Los Angeles's Testing Ground for Transportation Efficiency" Harvard Kennedy School, Cambridge, MA, 2016. Accessible at http://datasmart.ash.harvard.edu/news/article/los-angeles-testing-ground-for-transportation-efficiency-803

Supplemental Readings:

- NYC Department of Transportation, "The Economic Benefits of Sustainable Streets." City of New York, 2013. Available at http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf
- Hossein Haghshenas and Manouchehr Vaziri, "Urban sustainable transportation indicators for global comparison." Ecological Indicators. Volume 15, Issue 1, April 2012. Available at http://ac.els-cdn.com/S1470160X11002974/1-s2.0-S1470160X11002974-main.pdf?_tid=efd6aad2-5700-11e5-99a5-00000aacb35d&acdnat=1441809904_889a599a9cac5e70296491af6668da5a
- Peter Roberts and Cordula Thum, "Transport Core Measures and Indicators: A Users Guide. The World Bank, Transport and Urban Department. March 2015 (Work in Progress). Available at http://siteresources.worldbank.org/INTTRM/Resources/514793-1131130428609/trial_Guide0503-web-links.pdf
- Alla Reddy, et al, "Designing New York City Subways' Key Performance Indicators to Improve Service Delivery and Operations." Transit, 2014 Volume 1. Transportation Research Record: Journal of the Transportation Research Board. Janurary 2014. Available at http://lexciestuff.net/Papers/14-1710_BSC_KPI_036.pdf

Week 7: Air Quality (October 23)
Guest Lecturer: Iyad Kheirbek, Executive Director: Air Quality Program, NYC Department of Health and Mental Hygiene

Required Readings:

- Kheirbek, Iyad, Jay Haney, Sharon Douglas, Kazuhiko Ito, Steven Caputo, Jr., and Thomas Matte, "The Public Health Benefits of Reducing Fine Particulate Matter through Conversion to Cleaner Heating Fuels in New York City." Environmental Science and Technology. Volume 48, Issue 23. December 2014. Available on Canvas.
- Angel Hsu and Alisa Zomer, "Monitoring Global Air Pollution - Interactive Data Visualization." Scientific American. May 6, 2015. Available at http://www.scientificamerican.com/article/monitoring-global-air-pollution-interactive/
- World Health Organization. "Ambient (outdoor) air quality and health". Fact sheet No 313. WHO, March 2014. http://www.who.int/mediacentre/factsheets/fs313/en/
- Michal Krzyzanowski, et al. "Air Pollution in the Mega-cities." Global Environmental Health and Sustainability. Current Environmental Health Reports. Volume 1, Issue 3. September 2014. Available on Canvas.
- Angel Hsua, et al, "Towards the Next Generation of Air Quality Monitoring Indicators." Atmospheric Environment Volume 80, December 2013. Available at http://www.sciencedirect.com/science/article/pii/S1352231013005578 (free via Columbia login)
- Rob McDonald, et. al, "Planting Healthy Air." The Nature Conservancy, Washington, DC, 2016. Accessible at https://global.nature.org/content/healthyair?intc=glob_sol.sp

Supplemental Readings:

- American Lung Association "State of the Air 2017" American Lung Association, Chicago, IL, 2017. Accessible at www.lung.org/assets/documents/healthy-air/state-of-the-air/state-of-the-air-2017.pdf
- City of New York, The New York City Community Air Survey, 2008-2014. New York City Department of Mental Health and Hygiene. April 2016. Available at: https://www1.nyc.gov/assets/doh/downloads/pdf/environmental/comm-air-survey-08-14.pdf
- Michael Brauer, et al. "Exposure assessment for estimation of the global burden of disease attributable to outdoor air pollution." Environmental Science and Technology. Volume 46. Issue 2. January 2012. Available on Canvas.
- Air Pollution Monitoring – US EPA website: https://www3.epa.gov/airquality/montring.html

Week 8: Food Systems (October 30)
Required Readings:

- City of New York, "Five Borough Food Flow: 2016 New York City Food Distribution & Resiliency Study Results." New York, NY, 2016. Accessible at https://www.nycedc.com/resource/five-borough-food-flow
- City of New York, "2016 Food Metrics Report." New York, NY, 2016. Accessible at www1.nyc.gov/assets/foodpolicy/downloads/pdf/2016-Food-Metrics-Report.pdf
- Detroit Food and Fitness Collaborative, "Economic Analysis of Detroit's Food System." W.K. Kellogg Foundation, 2014. Accessible at https://dk-media.s3.amazonaws.com/AA/AY/pittsburghfoodpolicy/downloads/298058/Economic_Analysis_of_Detroit_s_Food_System.pdf
- JP Morgan Chase & Co Institute, "Going the Distance: Big Data on Resident Access to Everyday Goods." JP Morgan Chase, March 2017. Accessible at https://www.jpmorganchase.com/corporate/institute/document/institute-access-to-consumption-brief.pdf
- Kimberly Zeuli and Austin Nijhui, "The Resilience of America's Urban Food Systems." Initiative for a Competitive Inner City, Roxbury, MA, 2017. Accessible at http://icic.org/wp-content/uploads/2017/01/Rockefeller_ResilientFoodSystems_FINAL_post.pdf?x96880

- Global Panel, "Improved metrics and data are needed for effective food system policies in the post-2015 era. Technical Brief." London, UK: Global Panel on Agriculture and Food Systems for Nutrition, 2015. Accessible at http://glopan.org/sites/default/files/pictures/Metrics_Brief.pdf
- General Mills, "Global Responsibility 2017." General Mills, Hidden Valley, MN, 2017. (Pages 1 – 31). Accessible at http://www.generalmills.com/en/Responsibility//~/media/Files/GRR/GRR-2017-report.pdf

Supplemental Readings:

- Corinna Hawkes and Jess Halliday, "What Makes Urban Food Policy Happen?" International Panel of Experts on Sustainable Food Systems, 2017. Accessible at http://www.ipes-food.org/new-report-what-makes-urban-food-policy-happen
- Union of Concerned Scientists, "Fixing Food: Fresh Solutions from Five U.S. Cities." Union of Concerned Scientists, Washington, DC, January 2016. Accessible at http://www.ucsusa.org/food-agriculture/expand-healthy-food-access/fixing-food-fresh-solutions-five-us-cities-2016#.Walpz7LfouU
- Hatfield, Molly, "City Food Policy and Programs: Lessons Harvested from an Emerging Field." City of Portland, October 2012. Accessible https://www.portlandoregon.gov/bps/article/416396

***** No class November 6 for Academic Holiday *****

PART II. HOW DO ALL OF THESE EFFORTS ADD UP?

Week 9: Corporate Sustainability (November 13)
*** Problem set due at the beginning of class. ***
Guest Lecturer: Davida Heller, Vice President of Corporate Sustainability at Citi

Required Readings:

- Pivot Goals website (skim) http://pivotgoals.com/search.php
- World Economic Forum, "White Paper on Business Sustainability: What it is and why it matters," World Economic Forum, 2014. Accessible at http://www3.weforum.org/docs/GAC/2014/WEF_GAC_HumanRights_BusinessSustainability_WhitePaper_2014.pdf
- Global Reporting Initiative, "G4 Sustainability Reporting Guidelines: Reporting Principles and Standard Disclosures," GRI, Amsterdam, The Netherlands, 2013 (pages 3-18). Available at https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf
- Tullis, Paul, "Bloomberg's Push for Corporate Sustainability." Fast Company, April 2011. Available at http://www.fastcompany.com/1739782/bloombergs-push-corporate-sustainability
- Kering "Kering Environmental Profit and Loss." Kering, 2013. (pages 7-44) Available at http://www.kering.com/sites/default/files/document/kering_epl_methodology_and_2013_group_results_0.pdf
- KPMG International, "The KPMG Survey of Corporate Responsibility Reporting 2015." KPMG, 2016. Available at https://home.kpmg.com/xx/en/home/insights/2015/11/kpmg-international-survey-of-corporate-responsibility-reporting-2015.html

Supplemental Readings:

- Deloitte, "Sustainability & Compliance Trends." Deloitte, 2015. Available at http://www2.deloitte.com/content/dam/Deloitte/dk/Documents/risk/Deloitte-Sustainability-Trends.pdf
- Global Reporting Initiative, "Carrots and Sticks: Sustainability reporting policies worldwide – today's best practice, tomorrow's trends." GRI, Amsterdam, The Netherlands, 2013 (pages 8-24). Available at https://www.globalreporting.org/resourcelibrary/Carrots-and-Sticks.pdf

- Bloomberg LP, “Impact Report 2015.” Bloomberg LP, New York, NY, 2016. Available at https://data.bloomberglp.com/sustainability/sites/6/2016/04/16_0404_Impact_Report.pdf
- Walmart, “2016 Global Responsibility Report.” Walmart, 2016. Available at http://corporate.walmart.com/2016grr

Week 10: Equity and Prosperity (November 20)
Guest Lecturer: Niiobli Armah, Manager, Bloomberg Associates/My Brother’s Keeper

Required Readings:

- City of Santa Monica, “Summary Findings from the Local Wellbeing Index,” City of Santa Monica, 2015. Available at http://wellbeing.smgov.net/Media/Default/docs/WellbeingProjectFindingsSummary-FINAL.pdf
- City Prosperity Initiative, “2015 Global City Report.” UN Habitat, New York, NY, 2016. Accessible at https://unhabitat.org/wp-content/uploads/2016/02-old/CPI_2015%20Global%20City%20Report.compressed.pdf
- Detroit Future City, “139 Square Miles.” DFC, Detroit, MI, 2017. (skim) Accessible at
- Frank, Adam, “What Does It Take To See Gentrification Before It Happens?” National Public Radio, Washington, DC, August 29, 2017. Accessible at http://www.npr.org/sections/13.7/2017/08/29/546980178/what-does-it-take-to-see-gentrification-before-it-happens?cid=social_20170901_73865167&adbid=903584140624199680&adbpl=tw&adbpr=727524717121409024
- Solomon Greene and Kathryn L.S. Pettit, “What if Cities Used Data to Drive Inclusive Neighborhood Change?” Urban Institute, Washington, DC, June 2016. Accessible at http://www.urban.org/research/publication/what-if-cities-used-data-drive-inclusive-neighborhood-change
- City of Seattle, “Equity & Environment Agenda” City of Seattle, Seattle, WA, 2016. Accessible at https://www.seattle.gov/environment/about-ose/equity-and-environment

Supplemental Readings:

- http://www.urbandisplacement.org/policy-tools-2 (skim website)
- Washington, DC, “Sustainability DC,” Washington, DC, 2009. (Introduction and Equity & Diversity sections only). Available at http://sustainable.dc.gov/sites/default/files/dc/sites/sustainable/page_content/attachments/DCS-008%20Report%20508.3j.pdf

Week 11: Urban Sustainability (November 27)
Required Readings:

- Prakash, Mihir, et. al., “Achieving a Sustainable Urban America.” Sustainable Development Solutions Network, New York, 2017. Accessible at http://unsdsn.org/wp-content/uploads/2017/04/Report-SDG-Cities-Index-Master_MP_Fixed.pdf
- OECD, “Resilient Cities: Policy Highlights of the OECD Report (Preliminary version).” OECD, Paris, 2016. Accessible at http://www.oecd.org/cfe/regional-policy/resilient-cities-policy-highlights-preliminary.pdf
- Jones Lang LeSalle, “The Business of Cities 2015.” Jones Lang LeSalle, 2015. Available at http://www.jll.com/Research/jll-business-of-cities-report.pdf
- Siemens and The Economist Intelligence Unit, “The Green City Index: A summary of the Green City Index research series,” Siemens, 2012. http://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/gci_report_summary.pdf
- Arcadis, “Sustainable Cities Index 2016.” Arcadis, the Netherlands, 2016, Accessible at https://www.arcadis.com/en/global/our-perspectives/sustainable-cities-index-2016/

- City of New York, “PlaNYC 2011 Update”. Mayor’s Office of Long-Term Planning & Sustainability, April 2011. (introduction and skim some of the chapters) Available at http://www.nyc.gov/html/planyc/downloads/pdf/publications/planyc_2011_planyc_full_report.pdf
- City of New York, One New York: The Plan for a Strong and Just City. April, 2015. (Introduction and skim “Vision 2: Our Just and Equitable City”). Available at http://www.nyc.gov/html/onenyc/downloads/pdf/publications/OneNYC.pdf

Supplemental Readings:

- Tim Moonen and Greg Clark, “The Business of Cities 2013: What do 150 city indexes and benchmarking studies tell us about the urban world in 2013?”Jones Lang LeSalle, November 2013. Available at http://www.jll.com/Research/jll-city-indices-november-2013.pdf
- Ministry of the Environment and Water Resources, “Sustainable Singapore 2015 Blueprint,” Singapore, 2015. Available at http://www.mewr.gov.sg/ssb/files/ssb2015.pdf. Full website at http://www.mewr.gov.sg/ssb/
- Los Angeles, “pLAn: Transforming Los Angeles” City of Los Angeles, 2015. (Introduction and Equity sections only). Available at https://d3n8a8pro7vhmx.cloudfront.net/mayorofla/pages/17002/attachments/original/1428470093/pLAn.pdf?1428470093
- City of Philadelphia, “Greenworks Philadelphia.” (2009); and 2016 Progress Report. Available at http://www.phila.gov/green/index.html
- The Economist, “Global Liveability Ranking 2016.” The Economist Intelligence Unit, 2016. Available at http://www.eiu.com/public/topical_report.aspx?campaignid=liveability2016 (free registration)

Week 12: Wrap-up discussion and Final Presentations (December 4)

Week 13: Final Presentations (December 11)