

Sustainable Cities

New York University
Robert F. Wagner Graduate School of Public Service
Urban Planning Program, P11.2613(001) , Spring 2005

Class Times

Mondays, 8:10 - 9:50 pm

Instructor Contact

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Course Description

What is a sustainable city? How might we achieve one? At the beginning of the 21st century, it has become particularly clear that sustainability and cities are closely interconnected. Human history is filled with examples of cities and civilizations causing local environmental change, but over the past century, humanity has achieved the undesirable ability to degrade the earth's environment on a global scale. The growth of cities around the world is related closely to the simultaneous growth in humanity's population, our technological and economic activity, our social organization, and our physical consumption of land and resources.

The essence of sustainability concerns developing social, economic and technological systems that do not deplete the resources available to us. Alternative definitions of the concept will be presented and discussed, in light of its interconnected physical, social, historical and economic aspects.

The course will generally try to explore the following questions:

- Why is sustainability important?
- How can we judge theories of sustainable urban development?
- What are the key issues in understanding the environmental impact of cities?
- How can we shape our cities to lessen or enhance their effects on nature?

The primary concern of the course will be with the positive (as opposed to normative) aspects of sustainability, including the built environment, technology, ecology, biology, and economics. Sustainability also raises important questions in philosophy, culture and politics, which this course will not focus on directly.

Course Structure

This course is meant to be a collective effort to address the above questions and attempt to answer them, from the global level of the environment and cities to the most local city level. Attempting to understand sustainability at both levels will enable us to think concretely about what is and what is not sustainable. We will begin by studying the larger trends affecting the environment and cities, and through readings, discussion and coursework (more on that below), end by thinking about how New York might become more sustainable.

It is also a good idea set out your specific interests at the beginning of the course, so you can focus on and develop them in your reading, preparation for discussions, and your research paper.

The course will generally be structured as a fifty minute lecture and a fifty minute discussion. In the first class, we will discuss together your individual interests in sustainability and cities, and introduce the basic structure of the course. In the lectures, I will try to set the background for exploring the issues. In the discussion section, we will discuss your research, reading, or questions. Discussion leaders will also be assigned for each week, who will present briefly some issues or facts to kick-start a more informed discussion. We could also have discussion sections about specific questions that arise, that students are interested in pursuing further.

At the end of the semester, each student will present his or her work for roughly ten minutes, so we can all share the information that we have gathered throughout the semester.

Office hours are flexible, depending on my work schedule. The best way to contact me is either to e-mail me in advance with your questions – I will respond fairly quickly – or else to arrange a time to talk.

Course Reading

The course packet is required, from Unique Copy Center. The main texts for the course are:

- Beatley, T. 2000. *Green Urbanism: Learning from European Cities* (Island Press, Washington)
- Wheeler, Stephen, and T. Beatley, eds. 2004. *The Sustainable Urban Development Reader* (Routledge, London and New York)
- Portney, K. 2003. *Taking Sustainable Cities Seriously* (MIT Press, Cambridge, MA)

We will follow the structure of the books, so we will read these books in parallel, and supplement our discussion with texts from the course packet and additional further suggested readings for each lecture. There are also two copies of each of these books, plus many of the suggested references below, on reserve in the Bobst Library Reserve Room.

The reading that is required and supplemental will be indicated in each week's outline

Course Requirements, Grading, and Criteria:

One prerequisite for the course is P11.1018 Microeconomics, and another prerequisite or co-requisite is P11.2660 History and Theory of Planning or P11.1022 Introduction to Public Policy

We will try to spread out our work over the semester, so we do not find ourselves jammed at the end of the semester. Feel free to bounce ideas or questions off of me ahead of time. Work for the course will include:

1. Initial proposal for research topic and method, three-page minimum, including an extended abstract or summary of paper and a list of proposed sources (30%).
2. Class participation and student presentations. Active participation in discussion; preparations to lead class discussion for one class or topic; final student presentation of work (total 20%).

3. Research paper, including theoretical context, specific examples from other cities, and proposed applications to New York and other cities. The paper will be 7,000 words minimum, plus (not including) a required bibliography, optional pictures and exhibits (50%).

If you decide to focus on a particular topic or city early, then you can prepare the same topic in both of your presentations and your research paper, though each task should present different material as your research develops throughout the semester.

My grading criteria in general are the perspective, depth of questioning, thoroughness in research, and overall creativity that you show in your work. If you feel we need to discuss this further or in more detail, we can.

Finally, as our first collective effort at sustainability, please submit all work by e-mail in either .doc, .xls or .pdf formats.

Lecture Schedule:

Lectures 1-5 will generally define sustainability, and link the concept to cities.
Lectures 6-11 will address specific issues in infrastructure and urban form.
Lectures 12 & 13 are for student presentations, feedback and conclusions.

No class on January 17th, Martin Luther King Day

1. Introduction to Sustainable Cities (January 24th)

Class Outline:

- a. Course Introduction
- b. What is sustainability?
- c. Are cities the right scale for thinking about sustainability?
- d. How do we measure the environmental impact of cities?
- e. How do we measure the environmental impact of New York?

This lecture will introduce the structure of the course, gather the interests of the class in the subject, and explore basic definitions of sustainability. We will briefly touch on the origins of the *idea* of sustainability, the environmental movement, and the current state of nature, in order to develop a background and critical viewpoint from which to look at the environmental impact of cities. We will also examine whether cities are the appropriate scale at which to consider sustainability at all. Finally, we will briefly introduce ways that cities impact the environment – with a focus on New York in particular – as a transition into the next few lectures that outline larger questions about sustainability and cities.

Assigned Readings:

- o *Green Urbanism*, Chapter 1
- o *Sustainable Urban Development Reader*, pages 5-66
- o (Packet) Vitousek, P.M., Mooney, H.A., July 25th, 1997, *Science*, 277:5325, 494-500
- o (Packet): Melosi, Martin V. 1993. “The Place of the City in Environmental History,” *Environmental History Review* 17:1-23
- o (Web): Worldwatch Institute. “Environmental Milestones: A Worldwatch Retrospective Timeline”, www.worldwatch.org/features/timeline

Suggested Reading:

- McKibben, W. 1999. *The End of Nature*. New York; Anchor Books.
- McNeill, J.R. 2000, *Something New Under the Sun: An Environmental History of the Twentieth-century World*. New York: W.W. Norton.
- Shabecoff, P. 1993. *A Fierce Green Fire: The American Environmental Movement*. New York: Hill and Wang.

2. Global Urbanization (January 31st)

Class Outline:

- a. Is urbanization inevitable?
- b. Reasons for urbanization
- c. Urbanization in developing countries
- d. Urbanization in developed countries

As mentioned in the introduction, urbanization is a key feature of human development throughout history and in the present. We will list the historic reasons for urbanization, including the rise of agriculture, trade, technological and political organization, as a way to frame contemporary debates about the increasingly rapid pace of urbanization worldwide. We will then try to examine the current state of urbanization worldwide in order to distinguish the issues particular to regions and levels of development.

Assigned Readings:

- (Packet) Clark, David. 1998. "Interdependent Urbanization in an Urban World: A Historical Overview," *Geographical Journal* (U.K.) 164: 85-95.
- (Packet) Berry, Brian. 1990. "Urbanization." In: B.L. Turner et al., eds., *The Earth as Transformed by Human Action* (New York: Cambridge University Press), 103-19.
- (Packet) Waggoner, P.E., 1997. "How Much Land Can Ten Billion People Spare for Nature?" In: *Technical Trajectories and the Human Environment*, Washington, DC: National Academy Press.
- (Packet) Douglas, I. 1994. "Human Settlements." In: *Changes in Land Use and Land Cover*, Meyer, W.B. and Turner, B.L., Great Britain: Cambridge University Press, 149-70.
- (Web) Brinkhoff, Thomas. 1999. "Principal Agglomerations and Cities of the World." Web site address: <http://www.citypopulation.de>

3. Sustainability Indicators (February 7th)

Class Outline:

- a. Critical indicators of environmental health for cities, regions and the world
- b. Valuation of ecosystem services
- c. Basic measures of economic growth
- d. Revising the national accounts for environmental costs
- e. Ecological footprint concept
- f. Other methods of ecological assessment

From our first two lectures, we have seen that there are broad general concerns about the overall health of the planet and our urbanized areas, as well as particular local concerns about environmental quality and local constraints on further development. In this lecture we will attempt to outline

broadly the various concepts that people have used to measure objectively environmental degradation and improvement. We will consider the following aspects of sustainability indicators, including the critical environmental indicators for irreplaceable natural resources; how growth or development is generally measured; and various methods to take into account the consumption of natural resources. Then, we will move through a detailed examination of the data and method that goes into the 'ecological footprint' concept advocated by Girardet, Rees and Wackernagel; and discuss alternative methods of ecological assessment.

Assigned Readings:

- *Sustainable Urban Development Reader*, Part 3, pages 199-232, in particular focus on William Rees article, "What is an Ecological Footprint?", pages 211-219
- Portney, *Taking Sustainable Cities Seriously*, Chapters 2, 7 and 8
- (Packet) Farrell, A. and Hart, M. 1998. "What Does Sustainability Really Mean? The Search for Meaningful Indicators." *Environment*. 40(9): 4-7, 26-31.
- (Web) Redefining Progress "Footprint of Nations 2004 Report", <http://www.rprogress.org/programs/sustainabilityindicators/>

4. Ecological Health in Cities (February 14th)

- a. Minimum habitat sizes
- b. Ecological analysis of cities
- c. The biophilia hypothesis
- d. Psychological perception of nature by urban dwellers

What kind of interactions are possible between humans and nature in cities? We will consider the biophilia hypothesis and psychological perceptions of nature by urban dwellers. Then, we will consider on a biological basis the minimum habitat size required to preserve biodiversity, and determine the appropriate size of interventions to preserve biodiversity.

Assigned Readings:

- *Green Urbanism*, Part IV, Chapter 7
- *Sustainable Urban Development Reader*, pages 111-120
- (Packet) Flores, A., et al. 1998. "Adopting a Modern Ecological View of the Metropolitan Landscape: The Case of a Greenspace System for the New York City Region," *Landscape and Urban Planning*, 39: 295-308
- (Packet) Pickett, S.T.A., et al. 2001. "Urban Ecological Systems: Linking Terrestrial, Physical, and Socioeconomic Components of Metropolitan Areas," *Annu. Rev. Ecol. Syst.* 32:127-57
- (Packet) Turner, W., Nakamura, T., Dinetti, M. June 2004. "Global Urbanization and the Separation of Humans from Nature," *BioScience*, 54: 6, 585-590
- (Packet) Kinzig, A. et al. 2003. "Socioeconomics Drive Urban Plant Diversity", *Proceedings for the National Academy of Sciences*, 100:15:8788-8792

Suggested Additional Reading:

- Kellert, SR. 2002. *Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations* (MIT Press: Cambridge, MA)
- Wilson, E.O. 1984. *Biophilia* (Harvard University Press: Cambridge, MA)

No class on February 21st – President's Day

5. Human Health in Cities (February 28th)

- a. History of disease and cities
- b. Pollution and disease
- c. Food, economic development and health services

From the earliest cities, disease and immunity has played an important role in urban development. We will examine how cities change the causes of mortality and illness for their inhabitants; how to classify diseases and their effects on human populations; and consider how catastrophic illnesses might be defended against.

Assigned Readings:

- o (Packet) Selections from Garrett, L. 1994. *The Coming Plague*, New York: HarperCollins, pages 234-259
- o (Packet) *The Economist*. August 21st, 2004. "China's Growing Pains: Special Reports on Pollution and Health Care." 372: 8389, 11, 20-24, 52, 55-57, 60.
- o (Packet) Davis, Devra et al. "Urban Air Pollution Risks to Children: A Global Environmental Health Indicator," World Resources Institute, September 1999
- o (Web) Center for Children's Health and the Environment, Mount Sinai School of Medicine, http://childenvironment.org/factsheets/emerging_illnesses.htm

Suggested Additional Readings:

- o Sen, A. 1999. *Development as Freedom*. New York: Anchor Books.
- o Walters, M.J. 2003. *Six Modern Plagues*. Covelo: Island Press.

6. Water and Material Flows (March 7th)

The infrastructure for water and material flows is one of the major developments of modern cities. There has also been considerable attention paid to the subject since the United Nations declared 2003 the Year of Freshwater. In both developing and developed cities, access to freshwater is a critical factor for the sustainability of cities. How can water supply and demand be balanced, and what are the implications of increased scarcity of water? Finally, it is possible to develop "closed-loop" systems that reduce both the supply and demand for water, and minimize the creation of end-wastes?

Assigned Readings:

- o *Green Urbanism*, Chapter 8
- o (Packet) Selected readings from Gandy, M., 2002, *Concrete and Clay: Reworking Nature in New York City*, Cambridge: MIT Press, pages 19-75
- o (Packet) O'Rourke, D., Connelly, L., and Koshland, C., 1996, "Industrial Ecology: A Critical Review", *Int. J. Environment and Pollution*, 6: 2-3, 89-112
- o (Packet) Selected readings from Tarr, J. 1996. *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective*, Akron: University of Akron Press. TBD.
- o (Web) Selected readings from National Resources Defense Council (NRDC) and the Pacific Institute, August 2004, "Energy Down the Drain: The Hidden Costs of California's Water Supply", <http://www.nrdc.org/water/conservation/edrain/contents.asp>, pages 1-36

**Course Assignments: Initial proposal for research topic and method due by e-mail, March 11th
Spring Break, March 14th – March 19th**

7. Energy and Transportation I (March 21st)

8. Energy and Transportation II (March 28th)

Class Outline:

- a. Growing energy use and speed of climate change
- b. Future energy prospects and scenarios
- c. What are the critical problems in energy use?
- d. Measuring the need for transportation in cities
- e. Transportation and urban form

In this lecture we will examine the basic need of cities for energy and transportation, and how these needs have shaped the development of cities. We will then briefly discuss the growing worldwide demand for energy and the problem of climate change, as crucial considerations in any future energy scenarios. By sketching out the basic allocation of energy to critical human activities, we will develop a relative sense of the various issues for energy use in buildings, transportation, industry, and so on. Transportation obviously constitutes a major portion of energy use. Evaluating the critical factors in energy and transportation also enables us to evaluate likely technological and economic shifts that are likely to affect cities in the future.

Assigned Readings:

- o *Taking Sustainable Cities Seriously*, Chapter 3
- o *Green Urbanism*, Part III, Chapters 4-6
- o *Sustainable Urban Development Reader*, pages 87-110
- o (Packet) Cassidy, J., October 11th, 2004, "Pump Dreams", in the *New Yorker*, pages 42-47
- o (Packet) Owen, D., October 18th, 2004, "Green Manhattan", in the *New Yorker*, pages 111-123
- o (Web) U.S. Department of Energy, Energy Information Administration (EIA). January 2003. *Annual Energy Outlook 2003* (Washington D.C.: EIA).
- o (Web) Wood, J.H. et al. 2004. "Long Term World Oil Supply Scenarios", http://www.eia.doe.gov/pub/oil_gas/petroleum/feature_articles/2004/worldoilsupply/oilsupply04.html
- o (Web) Shell International, Global Business Environment, 2001. "Energy Needs, Choices, and Possibilities: Scenarios to 2050," www.shell.com/static/media-en/downloads/51852.pdf

Suggested Additional Reading:

- o Smil, Vaclav. 1994. *Energy in World History* (Boulder: Westview).
- o Intergovernmental Panel on Climate Change. 2001. *Climate Change 2001: The Scientific Basis* (Cambridge, England: Cambridge University Press), www.grida.no/climate/ipcc_tar/.
- o Romm, Joseph J. 2004. *The Hype About Hydrogen* (Washington, D.C.: Island Press).

9. Density, Sprawl and Smart Growth (April 4th)

Class Outline:

- a. What is sprawl and its cost?
- b. What are the benefits of urban density?
- c. Mechanisms controlling urban density
- d. Real estate cycle
- e. Demographic changes
- f. Urban governance, policy and density

Much has already been written about the causes of suburban growth and its attendant problems, with sprawl as the culprit and many suggested solutions, including smart growth and New Urbanism, among others. We will examine the advantages and disadvantages of urban density from a specifically environmental viewpoint, and consider how urban density might be achieved in terms of the real estate cycle, demographic change, and urban policy. We will also compare American cities in particular with European cities.

Assigned Readings:

- *Taking Sustainable Cities Seriously*, Chapter 4
- *Green Urbanism*, Chapters 2 & 3
- (Packet) Selected reading from Nivola, P.S., 1999, *Laws of the Landscape*, Brookings Institution Press, Washington DC, pages 1-52
- (Web) Fulton, W., Mazurek, J., Pruetz, R., and Williamson, C. June 2004. "TDRs and Other Market-Based Land Mechanisms: How They Work and Their Role in Shaping Metropolitan Growth". Discussion Paper Prepared for the Brookings Institution Center on Urban and Metropolitan Policy
- (Web) U.S. Census Bureau Report P20-549, "Geographical Mobility: 2002 to 2003", March 2004
- (Packet) Tierney, J., September 26th, 2004, "The Autonomist Manifesto (Or, How I Learned to Stop Worrying and Love the Road)", in the *New York Times Magazine*, pages 59-65
- (Web) U.S. Smart Growth Network, "Getting to Smart Growth: 100 Policies for Implementation", www.smartgrowth.org

10. Green Building I – Techniques (April 11th)

11. Green Building II – Costs & Benefits (April 18th)

Buildings, as major components of the city, offer a considerable opportunity to improve the ecological performance of the city. We will examine new techniques for green building and case studies of their success (or failure). We will also examine the various incentives and disincentives for developers, owners, and tenants to utilize these new techniques. We will engage in a typical cost and benefit analysis of green building for each of these respective groups, and consider how improvements in building performance might be encouraged by both the market and regulations. Finally, we will examine if new infrastructure is needed to support these new buildings.

Assigned Readings:

- (Web) TBD. Source: U.S. Green Buildings Council, www.usgbc.org/resources/research.asp

Course Assignment: Final Papers Due, April 25th

12. Student Presentations (April 25th)

13. Student Presentations; Student Feedback; Summing Up (May 2nd)

ELECTRONIC RESOURCES

Course Blackboard Site

Blackboard is a course management software package written by a company called Blackboard, Inc., based in Washington, DC. Users of Blackboard can only interact with the program by using a web browser-based interface. The entire class should be enrolled automatically upon registration, and we will use the website to distribute articles and other information.

In order to login the class Blackboard site:

1. Login to <http://home.nyu.edu/>
2. Click on the "Academics" tab in the top right-hand corner.
3. You will see your course listed under the Classes section. Click on your course, and you will automatically be logged on to your Blackboard course.
4. Note: If you don't see a link for a NYU Blackboard course site, click on "Update Classes Information" at the bottom of the Classes section. Within a few seconds, the link should appear.

Web Resources

The following websites regularly feature new information, data, and reports on some of the topics that we'll be discussing. Another great way to get current articles and news (and to fill up your inbox daily) is to subscribe to news alerts either from websites or listservs. The starred websites below feature either e-mail newsletters or listserv mail services.

Of course, this list is by no means complete. I'd welcome any suggestions for websites to add (or remove). Please post any websites or information you find useful to the course message board.

City Sustainability Websites:

- City Mayor websites:
 - City Mayor: www.citymayors.com
- Northeast:
 - Boston, MA: www.tbf.org/indicators/
- Mid-Atlantic:
 - Baltimore, MD: www.epa.gov/brownfields/html-doc/sc_balti.htm
 - Baltimore Ecosystem Study: www.beslter.org
- Midwest:
 - Austin, TX: www.ci.austin.tx.us/sustainable/contents.htm
 - Central Texas Indicators: www.centex-indicators.org/report.html
 - Chicago, IL: www.egov.cityofchicago.org, <http://www.foresightdesign.org/>
 - Cleveland, OH: www.ecocitycleveland.org/index.html
- Southeast:
 - Jacksonville, FL: www.jcci.org/qol/qol.htm
- West:
 - Central Arizona Project: caplter.asu.edu
 - Boulder, CO: www.ci.boulder.co.us/environmentalaffairs/
 - Scottsdale, AZ: www.scottsdaleaz.gov
 - Portland, WA: www.planning.ci.portland.or.us/pdf/comprehensiveplan.pdf; www.sustainableportland.org
 - San Francisco, CA: www.sustainable-city.org; temp.sfgov.org/sfenvironment/aboutus/policy/sustain/

- San Jose, CA: temp.sfgov.org/sfenvironment/aboutus/policy/sustain/
- Santa Barbara, CA: www.sustainabilityproject.org
- Santa Monica, CA: santa-monica.org/epd/
- Seattle, WA: www.ci.seattle.wa.us/environment/
- Olympia, WA: www.olywa.net/roundtable
- United Kingdom:
 - London: www.london.gov.uk
- Canada:
 - Federation of Canadian Municipalities: www.fcm.ca

Federal Government:

- National Renewable Energy Laboratory: www.nrel.org
- U.S. Department of Energy:
 - Office of Energy Efficiency and Renewable Energy: www.eere.energy.gov/ *
 - Smart Communities Network: www.sustainable.doe.gov/overview/ovintro.shtml *
 - Clean Cities Initiative: www.eere.energy.gov/cleancities *
 - Energy Information Agency: www.eia.gov *
- U.S. Environmental Protection Agency: www.epa.gov
 - Smart Growth Network: www.smartgrowth.org *
 - Community-Based Environmental Protection: www.epa.gov/ecocommunity/index.htm

Environmental Organizations:

- Environmental Media Services: www.ems.org *
- Grist Magazine: www.gristmagazine.com *
- National Resources Defense Council: www.nrdc.org *
- NY Public Interest Research Group: www.nypirg.org
- WorldWatch Institute: www.worldwatch.org *

Green Building:

- GreenClips: www.greenclips.com *
- U.S. Green Building Council: www.usgbc.org/ *

New York City:

- Gotham Gazette: www.gothamgazette.com *

Sustainable Development:

- International Institute for Sustainable Development: www.iisd.ca
 - Linkages Update: www.iisd.ca/email/subscribe.htm *
 - Water-L News: www.iisd.ca/email/water-L.htm *
 - Climate-L News: www.iisd.ca/email/climate-L.htm *
- Pacific Institute: www.pacinst.org *
- World Business Council for Sustainable Development: www.wbcsd.ch *
- United Nations:
 - Division for Sustainable Development: www.un.org/esa/sustdev/index.html *
 - Environment Programme: www.unep.ch/
 - Human Settlements Programme, HABITAT: www.unhabitat.org/
 - Human Development Reports: hdr.undp.org/default.cfm
 - Intergovernmental Panel of Climate Change: www.ipcc.ch/
 - World Health Organization: www.who.int/en/
 - World Meteorological Organization: www.wmo.ch

Urban Planning & Policy:

- Brookings Institution, Metropolitan Policy Program: www.brookings.edu/metro *
- City Population: www.citypopulation.de
- Cyburbia: www.cyburbia.com
- PLANetizen: www.planetizen.com *
- Russell Sage Foundation: www.russellsage.org
- Trust for Public Land: www.tpl.org

**** NEWS ALERTS ****

Finally, a good way to browse through a lot of updates regularly is to set up a Google News alert. In the same way that you can search Google for a specific topic once, you can also set up a news alert to search and send updates regularly on particular topics.

Go to www.google.com;

Enter your search term in the main box, for example, “China and cities”;

Click News above the main box;

Click News alerts on the left-hand side.