New York University, Wagner Graduate School of Public Service
URPL-GP 2612 Adapting the Physical City: Innovations in Energy, Transportation, and Water
Fall 2011, Tuesday 4:55-6:35 PM, Silver Room 509
Professor Rae Zimmerman (rae.zimmerman@nyu.edu)
Office hours: Tuesdays, 1-4 PM (modifications will be announced) and by appointment

COURSE SYLLABUS AND OUTLINE

September 28, 2011 (watch for updates)

Summary and Objectives. A revolution has been occurring in the way energy, transportation, and water services are provided and used that goes beyond the boundaries of individual buildings and communities. Cities as we know them have relied upon traditional infrastructure to provide energy, transportation, water, and environmental services. Now, new innovations are emerging that present opportunities to reduce resource demand and address problems of resource scarcity, environmental contamination, and social inequities. These innovations have now become the foundation of not only popular movements but business practices also. Students will obtain the knowledge and skills to evaluate the performance, resource demands and impacts of these innovations relative to one another and to conventional infrastructure. The course will also cover ways to incorporate these new technologies and changes in user behavior in order to plan neighborhoods, communities and regions to conserve energy and water resources, promote environmental protection, and reduce the consequences of service disruptions. Communications and information technology often provide vital links for energy, water and transportation and ways to evaluate their influence on these other services are covered. Methods to balance alternative approaches within planning and policy frameworks are also emphasized. This course covers the evolution of physical elements of cities, the environmental consequences, the social adaptations to these new technologies, and challenges cities now face. Transformations in the development and application of planning standards and protocols to accommodate these new systems will be part of the course of study. The course combines separate streams of thought in the areas of smart growth, greening cities, and alternative energy, transportation and water.

Course Outline

I. The Context of Cities for Public Services – Framing the Issues
1. September 6 Introduction: Adopting New Directions
2. September 13 Environmental Drivers for Infrastructure Innovation: Quality of Life, Population, and Social Justice
3. September 20 Environmental Drivers: Catastrophes, Global Climate Change, and Public Services
II. Energy: Economies for Light, Heat, and Motion
4. September 27 Introduction: Energy Trends, Traditions and Hazard Impacts
5. October 4 Tinkering with Tradition: Alternative Fuels and Technologies (and continuation of introduction)
(October 11 No Class – University Holiday)
7. October 18 Integrating Energy Infrastructure into the Built Environment: Green Buildings
6. October 25 Nuclear Power (and continuation of other forms of alternative energy)
III. Transportation: Transforming Vehicles, Fuel, and Behavior
8. November 1 Transportation (transit) Initiatives
9. November 8 A Call for Innovation: Environment, Land Use and Equity
10. November 15 Transportation (non-transit) Initiatives
11. November 22 Transportation Trends, Traditions, and Hazard Impacts
IV. Water: Too Little, Too Much, Too Dirty?
12. November 29 Trends, Traditions and Hazard Impacts for Water and Wastewater
13. December 6 Innovations in the Provision of Water Services
V. Integration: Greening the Gray City
14. December 13 Synthesis and Discussion of Student Papers

COURSE INSTRUCTIONS

Availability of Course Readings
Required and optional readings are listed under each lecture. Extensive use will be made of the course Blackboard site for course material and assignments. Students must be sure to activate their blackboard accounts. Course readings are available as follows:

(1) Bookstore and Reserve Room of Bobst Library
Required:
R. D. Bullard (2007) *Growing Smarter*, Cambridge, MA: MIT Press.
P.H. Gleick (2009) *The World's Water, 2008-2009*, Washington, DC: Island Press.
National Academy of Sciences (NAS) (2010) *Electricity from Renewable Resources: Status, Prospects, and Impediments*, Washington, DC: National Academy Press. Also on line.
P. L. Schiller, E. C. Bruun and J. R. Kenworthy (2010) *Introduction to Sustainable Transportation: Policy, Planning and Implementation*, Earthscan, Washington DC
Optional:
J. Randolph and G.M. Masters (2008) *Energy for Sustainability. Technology, Planning, Policy*, Washington, DC: Island Press.
William R. Black (2010) *Sustainable Transportation. Problems and Solutions*. New York, NY: The Guilford Press.
(2) Course Packet (Book Chapters): Available for purchase from the NYU Professional Bookstore (copyrighted materials). A copy is also available for viewing at the Puck building.
(3) Journal articles (available from Bobst Library online)
(4) Internet (where a link is available) and/or Blackboard (posted by lecture number).

Course Assignments and Requirements
(Detailed instructions for these assignments are on Blackboard under the "Assignments" tab)
Objectives of the assignments are to:

- evaluate the impacts of decisions about how public services and development use environmental resources by applying "green or carbon calculators" to infrastructure;
- analyze or critique a debate about a new technology in light of competing alternatives;
- overcome obstacles to adopting new technologies; and
- design energy, transportation, or water needs of a city to optimize environmental quality, resource conservation, and social equity.

1. Study questions and exercises: Two graded short exercises covering readings and skills will be required. Students will have some choice within each exercise. Due: Sept. 27; Nov. 29
2. Mid-Term Assignment: Analysis of a selected case or two comparative cases on the implementation and performance of alternative technologies using environmental and socioeconomic criteria. Students choose from topics or cases. The mid-term will in part provide a foundation for the final paper. Due: Nov. 1
3. Final Paper Assignment and Selected Presentations: Paper analyzing a case or case area selected for the mid-term; in-class discussion of individual papers. Due: Dec. 13
Course Grading Criteria: Study Questions: 30%; Mid-Term Paper: 30%; Final Paper and Class Discussion of Papers: 30%; Class Participation: 10%; Students are required to comply with the Wagner Academic Code located at **http://wagner.nyu.edu/students/policies/**. The NYU document is also available on the course Blackboard site under "Course Information".

P11.2612 Fall 2010: Detailed Course Lecture Outline and Readings

NOTE: Several guest lectures are planned given by professionals in government, academia, or the private sector actively engaged in infrastructure innovations. Readings listed below for those lectures will be covered in an abbreviated form prior to or in subsequent lectures as appropriate. Lectures for the semester are listed below with readings for each lecture. Readings are divided into required or optional readings. Note: Some lectures may extend over more than one week.

I. THE CONTEXT OF CITIES FOR PUBLIC SERVICES – FRAMING THE ISSUES

The natural environment as a critical part of the infrastructure that supports human activity; drivers for adaptation and change in energy, transportation and water, including environmental quality and quality of life considerations, global warming, resource depletion, resource uncertainty, and social justice issues such as inequitable costs and availability of resources for public services. The first five lectures provide a framework for the specific sectors of energy, transportation and water later in the semester.

Lecture 1. Introduction: Adopting New Directions (September 6)

Required Readings (to be extended through Lecture 2)

Internet: ASCE Report Card 2009 – introductory sections only (note: the full report card is available on Blackboard under Course reference materials)

- www.asce.org/reportcard: skim "grades", 1 table
- http://www.infrastructurereportcard.org/report-cards "Estimated 5-Year Investment Needs in Billions of Dollars," 1 table

Internet & Blackboard: National Academy of Sciences (2009) TRB Special Report 298 *Driving and the Built Environment*, Washington, DC: National Academy Press

- Summary Report in Brief, 4 pp. http://onlinepubs.trb.org/onlinepubs/sr/sr298summary.pdf
- Calthorpe (August 2010) Critique of TRB 298 Driving and the Built Environment – Critique. 4pp (references 2pp) http://www.calthorpe.com/files/TRB-NAS%20Report%20298%20Critique_0.pdf

Internet & Blackboard: NYC (2005) "High Performance Infrastructure Guidelines", pp. 6-29 http://designtrust.org/pubs/05_HPIG.pdf

Lecture 2. Environmental Drivers for Infrastructure Innovation: Quality of Life, Population and Social Justice (September 13)

Required Readings

A. Development Patterns, Land Use, and Green Building (continued from Lecture 1)

Course Packet: T. Beatley (2000) Chapter 2: "Land Use and Urban Form: Planning Compact Cities," *Green Urbanism*, Washington, DC: Island Press, pp. 29-75.

B. Measuring Sprawl and Carbon Footprints (also see references for Assignment 1)

Internet: SustainLane US City Rankings:

Overview. http://www.Sustainlane.com/cityindex/; http://www.sustainlane.com/us-city-rankings/

Methodology. http://www.sustainlane.com/us-city-rankings/methodology.jsp

Internet & Blackboard: M. A. Brown, F. Southworth, and A. Sarzynski (2008) *Shrinking the Carbon Footprint of Metropolitan America*, Washington, DC: Brookings, 16pp. http://www.brookings.edu/reports/2008/~/media/Files/rc/papers/2008/05_carbon_footprint_sarzynski/carbonfootprint_brief.pdf

C. Social Justice

Bookstore and Library Reserve: R. D. Bullard (2007) *Growing Smarter*, Cambridge: MIT Press-

- "Introduction," pp. 1-8;
- Chapter 1, R.D. Bullard, "Smart Growth Meets Environmental Justice," pp. 23-44;
- Chapter 6, M. Wiley, "Smart Growth and the Legacy of Segregation in Richland County, South Carolina," pp. 149-168 (in particular pp. 157-160).

Optional (Available for Class)

Internet: Z. S. Naphtali, C. E. Restrepo & R. Zimmerman (2007) "Using GIS to Examine Environmental Injustice in the South Bronx. The Case of Waste Transfer Stations," *Connect*, pp. 23-28. http://www.nyu.edu/its/pubs/connect/spring07/ http://www.nyu.edu/its/pubs/connect/spring07/pdfs/naphtali_gis.pdf

C.E. Restrepo and R. Zimmerman (2008) "Environmental Justice," *Encyclopedia of Quantitative Risk Analysis and Assessment*, E. L. Melnick and B. S. Everitt, eds. Chichester, UK: John Wiley & Sons, Ltd, Vol. 2, pp. 808-817.

Lecture 3. Environmental Drivers for Infrastructure Innovation: Catastrophes, Global Climate Change and Public Services (September 20)

Required Readings: Readings are organized by sources and impacts of infrastructure disruptions and adaptations to reduce the consequences.

A. Sources and Impacts of Infrastructure Disruptions

Climate Change and Natural Hazards:

Internet & Blackboard: J. Freeman, J. Blunden, and D. Arndt (June 2011) *State of the Climate in 2010* Highlights, NOAA, NCDC, 8 pp. http://www1.ncdc.noaa.gov/pub/data/cmb/bams-sotc/2010/bams-sotc-2010-brochure-lo-rez.pdf
General site: http://www.ncdc.noaa.gov/bams-stateof-the-climate

Internet & Blackboard: IPCC Fourth Summary (November 16, 2007) *Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report*. 22 pp. (Skim) http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

Internet & Blackboard: International Strategy for Disaster Reduction (2010) "2010 Disasters in Numbers," 2 pp. http://www.unisdr.org/files/17613_rectoversodisasters2010.pdf

Library online: R.J. Nicholls and A. Cazenave (June 18, 2010) "Sea-Level Rise and Its Impact on Coastal Zones," *Science*, Vol. 328, pp. 1517-1520.

Library online: S. Solomon, G-K Plattner, R. Knutti, and P. Friedlingstein (2009) "Irreversible climate change due to carbon dioxide emissions," *PNAS* Vol. 106, No. 6, pp. 1704-1709.

Human-Initiated Hazards:

Internet & Blackboard: J.M. Diamond (January 29, 2004) "Lessons from Environmental Collapses of Past Societies," National Council for Science and the Environment, pp. 8-25. http://ncseonline.org/2004conference/PDF/jared_diamond_report.pdf

B. Innovations for Mitigation and Adaptation to Reduce Risks to Infrastructure and Its Users

United States Department of State (June 2010) *U.S. Climate Action Report 2010*, Washington, DC: Global Publishing Services, pp. 10-21; 86-90. http://www.state.gov/documents/organization/140636.pdf

Bookstore and Library Reserve: R. D. Bullard, ed. (2007) *Growing Smarter*, Cambridge: MIT Chapter 8: B. Wright and R.D. Bullard, "Washed Away by Hurricane Katrina: Rebuilding a "New" New Orleans," pp. 189-206.

Optional

Library online: S. Pacala and R. Socolow (August 13, 2004) "Stabilization Wedges: Solving the Climate Problem for the next 50 Years with Current Technologies," *Science*, Vol. 305, No. 5686, pp. 968-972.

Internet: City of New York (April 2011) *plaNYC. A Greener, Greater, NY*. Climate Change. http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_planyc_full_report.pdf

Internet: R. Zimmerman and C. Faris, "Infrastructure Impacts and Adaptation Challenges," Chapter 4 in *New York City Panel on Climate Change 2010 Report*, C. Rosenzweig and W. Solecki, Eds. *Annals NY Academy of Sciences*, Vol. 1187. New York, NY, NY Academy of Sciences, 2010, pp. 63-85. Available on line at: http://www3.interscience.wiley.com/cgi-bin/fulltext/123443062/PDFSTART.

II. ENERGY: ECONOMIES FOR LIGHT, HEAT, AND MOTION

Traditional and innovative ways of approaching production, distribution, consumption of energy and byproduct utilization; trends in reliability and resiliency; options and alternatives for the provision of energy residences and industry.

Lecture 4. Energy Trends, Traditions, and Hazard Impacts (September 27)

Exercise 1 Due September 27

Required Readings

A. Trends in Energy Production and Consumption

Internet and Blackboard: U.S. DOE Energy Information Administration (March 2011) *Emissions of Greenhouse Gases in the United States 2009*, pp. 1-20. http://www.eia.gov/environment/emissions/ghg_report/pdf/0573%282009%29.pdf

B. Reliance on Fossil Fuels

Course Packet/Library Reserve: R. T. Wright and D. F. Boorse (2011) Chapter 14, "Energy from Fossil Fuels," *Environmental Science*, San Francisco, CA: Pearson, 11th Ed., pp. 348-372.

Course Packet/Library Reserve: R. T. Wright and D. F. Boorse (2011) Chapter 15, "Nuclear Power," *Environmental Science*, San Francisco, CA: Pearson, 11th Ed., pp. 373-396.

Optional

Library online: J.S. Simonoff, C.E. Restrepo, and R. Zimmerman (2007) "Risk Management and Risk Analysis-Based Decision Tools for Attacks on Electric Power," *Risk Analysis*, Vol. 27, No. 3, pp. 547-570.

Library: F.R. Steiner and K. Butler and APA (2007), *Planning and Urban Design Standards*. Student Edition. NY: Wiley, "Utilities," pp. 182-193.

Lecture 5. Tinkering with Tradition: Alternative Fuels and Renewable Energy Technologies (October 4)

Required Readings

Internet and Bookstore: National Academy of Sciences (2010) *Electricity from Renewable Resources: Status, Prospects, and Impediments*. Washington, DC: National Academy Press. https://download.nap.edu/catalog.php?record_id=12619 (Click download free pdf on left)

Course Packet: J. A. Layzer (2012) Chapter 11, "Cape Wind. If Not Here, Where? If Not Now, When?" in The Environmental Case. Translating Values into Policy, Washington, DC: CQ Press, pp. 308-347.

Library online: A. Davis, J. Rogers and P. Frumhoff (October 2008) "Putting Wind to Work. The challenges of balancing conservation, climate change, and local siting issues," *Planning*, pp. 36-41.

Internet: U.S. Department of Energy, Energy Information Administration (EIA): State Incentives for Renewable Energy: http://www.dsireusa.org

Optional - Renewable Fuels: Sun, Wind, Water

P. Newman (August 2007) "Beyond Peak Oil: Will Our Cities Collapse?" *Journal of Urban Technology*, Vol. 14, No. 2, pp. 15-30.

(1) Solar

K. Zweibel, J. Masin, and V. Fthenakis (2007) "A Solar Grand Plan," *Scientific American*, pp. 64-73.

Sandra Curtin, Jennifer Gangi and Elizabeth Delmont (June 2011) State of the States: Fuel Cells in America 2011 Breakthrough Technologies Institute in Washington, DC. http://www.fuelcells.org/StateoftheStates2011.pdf

(2) Wind

U.S. DOE, NREL, Wind Powering America.
General reference: http://www.eere.energy.gov/windandhydro/windpoweringamerica/;
Wind Energy Update (April 2011):
http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/wpa_update.pdf

Wind Energy by State: K. Atwood (2008) "Wind Energy: A National Perspective," Ball State U. http://cms.bsu.edu/Academics/CentersandInstitutes/BBR/~/media/DBDD9782BDCA4A1787C6736F7DA71468.ashx

(3) Smart Grid

P. Fairley (2001) "A Smarter Power Grid," *Technology Review*, pp. 41-49.

October 11. No Class – University President's Day Holiday.

Lecture 6. Integrating Energy Infrastructure into the Built Environment: Green Buildings (October 18)

Required Readings

Internet: U.S. EPA (October 2008) *Reducing Urban Heat Islands: Compendium of Strategies*. http://www.epa.gov/heatisld/resources/compendium.htm

Internet & Blackboard: Fiona Cousins (February 2007) "Down to Zero," *ARUP Journal*. http://www.arup.com/_assets/_download/88C68E29-19BB-316E-4055A7DFC5EF7ECB.pdf

Cases:
Internet & Blackboard: City of NY (April 2011) *plaNYC. A Greener, Greater, NY*. Energy, pp. 104-117.
Internet & Blackboard: City of NY (December 2009) *Greener, Greater Buildings Plan*, 4 pp. http://www.nyc.gov/html/planyc2030/downloads/pdf/greener_greater_buildings_final.pdf
NYC green buildings website http://www.nyc.gov/html/oec/html/green/green.shtml
Internet & Blackboard: NYC Green Codes Task Force (February 2010) Report. Executive Summary. New York, NY Urban Green, U.S. Green Building Council Chapter http://www.urbangreencouncil.org/greencodes/greencodestaskforce_exsummary_final.pdf
Library online: T. Beatley (August 2007) "Envisioning Solar Cities: Urban Futures Powered by Sustainable Energy," *Journal of Urban Technology*, Vol. 14, No. 2, pp. 31-46.

Lecture 7. Nuclear Power (October 25)

Required Readings
Course Packet: R. T. Wright and D. F. Boorse (2011) Chapter 15, "Nuclear Power," in *Environmental Science*, San Francisco, CA: Pearson Education, Inc., 11th Ed., pp. 373-396.
Internet & Blackboard: P. A. Baisden (2003) "Renaissance for Nuclear Power?" in Organizing Committee for the Workshop on Energy and Transportation, NAS, ed., *Energy and Transportation*, Washington, DC: NAS, pp. 49-55. http://www.che.ncsu.edu/ILEET/CHE596web_Spr2010/resources/general/NRC_Energy%20and%20Transportation-2003.pdf
Library online: D. Clery (August 19, 2005) "Nuclear Industry Dares to Dream of a New Dawn," *Science*, Vol. 309, pp. 1172-1175.

Cases to be covered in lecture:
Nuclear Waste Repository at Yucca
Internet: U.S. EPA, About Yucca Mountain Standards - http://www.epa.gov/radiation/yucca/about.html#types_radioactive
Fukushima and the World's Reaction, readings to be assigned

III. TRANSPORTATION: TRANSFORMING VEHICLES, FUEL, AND BEHAVIOR

Traditional transportation methods and their social, economic and environmental implications; options for green transportation including travel mode, travel technology, and amount of travel.

Lecture 8. Transportation (rail-based transit) Initiatives (November 1)

Required Readings
Bookstore: P.L. Schiller, E.C. Bruun and J.R. Kenworthy, *An Introduction to Sustainable Transportation*, Washington, DC: Earthscan, pp. 96-100
Course Packet: T. Beatley (2000) Chapter 4: "Transit Cities: Public Transport Innovations and Priorities," *Green Urbanism*, Washington, DC: Island Press, pp. 109-136.
Internet & Blackboard: Cases (choose two of the three to read):

(1) Mass Transit – Green Technologies (New York City) Internet & Blackboard: MTA (2009) Greening Mass Transit & Metro Regions. Final Report of the Blue Ribbon Commission on Sustainability and the MTA. New York, NY: The MTA. http://www.mta.info/sustainability/pdf/SustRptFinal.pdf

(2) Bus Rapid Transit (North America) John Niles and Lisa Callaghan (June 2010) From Buses to BRT: Case Studies of Incremental BRT Projects in North America, San Jose, CA: Mineta Transportation Institute, San Jose State University. http://www.reconnectingamerica.org/assets/Uploads/2010_bus2brt.pdf

(3) Cycling (Europe) John Pucher and Ralph Buehler (July 2008) Making Cycling Irresistible: Lessons from the Netherlands, Denmark, and Germany," *Transport Reviews*, Vol. 28, No. 4 at http://www.policy.rutgers.edu/faculty/pucher/Irresistible.pdf.

Cases:

Bookstore: P.L. Schiller, E.C. Bruun and J.R. Kenworthy, *An Introduction to Sustainable Transportation*, Washington, DC: Earthscan, pp. 198; 203; 259-295.

Internet and Blackboard: City of New York (April 2011) *plaNYC. A Greener, Greater, NY.* Transportation, pp. 86-99.

Lecture 9. A Call for Innovation: Environment, Land Use and Equity (November 8)

Required Reading

A. Reducing Transportation Impacts on the Environment

Internet & Blackboard: Todd Litman with Rowan Steele (July 9, 2010) "Land Use Impacts on Transport: How Land Use Factors Affect Travel Behavior," Victoria Transport Policy Institute, pp. 5-11; skim pp. 12-49. http://www.vtpi.org/landtravel.pdf

Packet 1: C.C. Bae (2004) "Transportation and the Environment," in S. Hanson and G. Giuliano, eds. *The Geography of Urban Transportation* 3rd edition, New York, NY: Guilford, pp. 356-381.

Internet & Blackboard: Michael Replogle (December 2007) "Does the Rubber meet the Road? Investigating the Alternatives to Congestion Pricing," NY: EDF. http://www.environmentaldefense.org/documents/7393_Alternatives_Congestion.pdf

B. Equity

Bookstore and Library Reserve: R. D. Bullard, ed. (2007) *Growing Smarter*. Cambridge, MA: MIT Press. Section III: Transportation Equity, pp. 215-320.

C. Alternatives

Internet & Blackboard: USDOT, FHWA (May 2010) *The National Bicycling and Walking Study: 15-Year Status Report* http://drusilla.hsrc.unc.edu/cms/downloads/15-year_report.pdf

Internet: Elisabeth Rosenthal (June 26, 2011), "Europe Stifles Drivers in Favor of Alternatives," *The New York Times* http://www.nytimes.com/2011/06/27/science/earth/27traffic.html?hp

Case Examples: Advances in roadway design and management: Smart Streets; Complete Streets; Ecological Corridor Strategies

Optional:

Blackboard: Port Authority of New York and New Jersey (2010) *Sustainable Infrastructure Guidelines*, New York, NY: PANYNJ.

Lecture 10. Transportation (road-based) Initiatives (November 15)

Required Readings

A. Alternative Modes of Travel

Bookstore: P.L. Schiller, E.C. Bruun and J.R. Kenworthy, *An Introduction to Sustainable Transportation*, Washington, DC: Earthscan, pp. 25-46; 52-53; 63-73; 87-96; 100-111; 236-244.

B. Alternative Vehicular design, fuel type, and fuel usage – recent advances

Bookstore: P.L. Schiller, E.C. Bruun and J.R. Kenworthy, *An Introduction to Sustainable Transportation*, Washington, DC: Earthscan (see sections under alternative modes)

Internet: Renewables – General References

U.S. Department of Energy, Energy Information Administration:
http://www.eia.doe.gov/cneaf/alternate/page/atftables/atf14-20_05.html
http://www.eia.doe.gov/cneaf/alternate/page/atftables/afvtransfuel_II.html

a. Main site for renewables: http://www.eia.doe.gov/fuelrenewable.html

b. Basic Introductory Primer for Renewables (terms, definitions):
http://www.eia.doe.gov/neic/brochure/renew05/renewable.html

c. Renewable Fuel Use Trends:
http://www.eia.doe.gov/cneaf/solar.renewables/page/trends/rentrends.html

(1) Hydrogen

Internet & Blackboard: U.S. Congressional Research Service, "A Hydrogen Economy and Fuel Cell: An Overview," January 14, 2004.
http://www.ncseonline.org/NLE/CRSreports/04Jan/RL32196.pdf

(2) Hybrid/Electric Vehicles

Internet & Blackboard: NYC (January 2010) PlaNYC, "Exploring Electric Vehicle Adoption in NYC."
http://www.nyc.gov/html/planyc2030/downloads/pdf/electric_vehicle_adoption_study_2010-02.pdf

Optional

Internet: D. Sperling and J. Ogden, "The Hope for Hydrogen," *Issues in Science and Technology*, Spring 2004, pp. 82-86. http://www.issues.org/20.3/sperling.html

Internet: J.J. Romm, "The Hype about Hydrogen," *Issues in Science and Technology*, Spring 2004, pp. 74-81. http://www.issues.org/20.3/romm.html

Library Online: M. Moyer (July 2010) "The Dirty Truth about Plug-In Hybrids," *Scientific American*, Vol. 303, No. 1, pp. 54-55.

Lecture 11. Transportation Trends, Traditions, and Hazard Impacts (November 22)

Required Readings

A. Hazards Affecting Transportation

Weather:

Internet & Blackboard: T. Litman (September 20, 2005) "Lessons from Katrina and Rita: What Major Disasters Can Teach Transportation Planners," Victoria, BC: Victoria Transport Policy Institute, 22 pp. http://www.vtpi.org/katrina.pdf

Global Climate Change:
Internet & Blackboard: U.S.DOT, FHWA (March 2009) NHTS Brief. "The Carbon Footprint of Travel," 3 pp. http://nhts.ornl.gov/briefs/Carbon%20Footprint%20of%20Travel.pdf
Terrorism:
Library online: B.D. Taylor, C.N.Y Fink, and R. Liggett (July 2006) "Responding to Security Threats in the Post-9/11 Era - A Portrait of U.S. Urban Public Transit," *Public Works Management & Policy*, Vol. 11, No. 1, pp. 3-17.

B. Transportation Patterns and Trends: Highways, Transit
Bookstore: P.L. Schiller, E.C. Bruun and J.R. Kenworthy, *An Introduction to Sustainable Transportation*, Washington, DC: Earthscan, pp. 1-21
Internet & Blackboard: Peg Young (April 2010) "Upward Trend in VMT Resumed. Transportation Trends in Focus," Washington, DC: FHWA, 2 pp. http://www.bts.gov/publications/bts_transportation_trends_in_focus/2010_04_01/pdf/entire.pdf
Internet & Blackboard: American Public Transportation Association (APTA) (April 2011) 2011 *Public Transportation Fact Book*, Washington, DC: APTA. (Skim) http://www.apta.com/resources/statistics/Documents/FactBook/APTA_2011_Fact_Book.pdf

Optional
Library: F.R. Steiner and K. Butler and APA (2007) *Planning and Urban Design Standards*. Student Edition. NY: Wiley, Transportation 143-165.

IV. WATER: TOO LITTLE, TOO MUCH, TOO DIRTY?

Issues and alternatives associated with the supply and quality of drinking water, wastewater management, and flood control.

Lecture 12. Trends, Traditions for Water and Wastewater and Hazard Impacts (Nov. 29)

Required Readings
Course Packet: M. Palaniappan, E. Lee, A. Samulon (2006) "Environmental Justice and Water," P.H. Gleick, ed. *The World's Water 2006-2007*, Washington, DC: Island Press, pp. 117-135.
Bookstore: H. Cooley (2009) "Water management in a Changing Climate," in P.H. Gleick *The World's Water, 2008-2009*, Washington, DC: Island Press, pp. 39-56.
Internet & Blackboard: U.S. Congress, Congressional Budget Office (August 2007) "Trends in Public Spending on Transportation and Water Infrastructure, 1956-2004." http://www.cbo.gov/ftpdocs/85xx/doc8517/08-08-Infrastructure.pdf
Blackboard: R. Zimmerman and N. Gilbertson (December 1999) "The North River Wastewater Treatment Plant, NYC," New York, NY: NYU-Wagner, ICIS.
Internet & Blackboard: City of New York (April 2011) *plaNYC. A Greener, Greater, NY*. Water supply pp. 74-85; waterways (water quality) pp. 58-73.
http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_planyc_full_report.pdf
Bookstore: M. Palaniappan and P.H. Gleick (2009) "Peak Water," In: P.H. Gleick, *The World's Water, 2008-2009*, Washington, DC: Island Press, pp. 1-16.

Cases:

Bookstore: P.H. Gleick (2009) "Three Gorges Dam Project, Yangtze River, China," In: P.H. Gleick *The World's Water, 2008-2009*, Washington, DC: Island Press, pp. 139-150.

Internet & Blackboard: U.S. EPA (August 2010) *Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure*. Washington, DC: U.S. EPA. http://www.epa.gov/owow/NPS/lid/gi_case_studies_2010.pdf

Internet: General U.S. EPA web site: http://yosemite.epa.gov/opa/admpress.nsf/Press%20Releases%20-%20Water!OpenView

Optional

Internet: U.S. EPA (September 2002) "The Clean Water and Drinking Water Infrastructure Gap Analysis," Washington, DC: U.S. EPA.

Bookstore: F.R. Steiner and K. Butler and APA (2007) *Planning and Urban Design Standards*. Student Edition, NY: Wiley, Water Resources, pp. 59-71; Wastewater, pp. 184-185; Stormwater, pp. 186-189; Water Supply, pp. 190-191.

W.M. Fedien and E.S. Winkler (November 2006) "Planning Issues for On-site and Decentralized Wastewater Treatment," Planning Advisory Service Report 542. Theory of Treatment pp. 11-12; Conventional Decentralized Wastewater Treatment Systems (Septic Systems), pp. 13-15.

Lecture 13. Innovations in the Provision of Water Services (December 6)

Required Readings

Bookstore: H. Cooley and and P.H. Gleick (2009) "Urban Water Use Efficiencies: Lessons from United States Cities," In: P.H. Gleick (2009) *The World's Water, 2008-2009*, Washington, DC: Island Press, pp. 101-122.

Bookstore: H. Cooley (2009) "Water Management in a Changing Climate," In: P.H. Gleick (2009) *The World's Water, 2008-2009*, Washington, DC: Island Press, Table 3.2, p. 46.

Bookstore: H. Cooley (2009) "Tampa Bay Desalination Plant: An Update," In: P.H. Gleick (2009) *The World's Water, 2008-2009* pp. 123-126.

Library online: C.L. Arnold and C. J. Gibbons (Spring 1996) "Impervious Surface Coverage: The Emergence of a Key Environmental Indicator," *APA Journal*, Vol. 62, No. 2 pp. 243-258.

Library online: J. Parrott (November 2007) "The Ins and Outs of Stormwater Management," *Planning*, pp. 26-31.

Internet & Blackboard: U.S. EPA (December 2009) Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects Energy Independence and Security Act Section 438. http://www.epa.gov/owow/NPS/lid/section438/pdf/final_sec438_eisa.pdf Skim.

Internet: U.S. EPA Green Infrastructure Managing Wet Weather with Green Infrastructure web site http://cfpub.epa.gov/npdes/home.cfm?program_id=298

Internet: New York City Green Infrastructure Plan – A Sustainable Strategy for Clean Waters, Executive Summary (c2010), New York, NY: NYC, 16 pp. http://www.nyc.gov/html/dep/pdf/green_infrastructure/NYCGreenInfrastructurePlan_ExecutiveSummary.pdf

Optional

W.M. Fedien and E.S. Winkler, "Planning Issues for On-site and Decentralized Wastewater Treatment," *Planning Advisory Service Report 542* (November 2006). Pp. 16-34.

P. H. Gleick (2002) *The World's Water, 2000-2001*. Washington, DC: Island Press. "Fog Collection as a Source of Water," pp. 175-181.
P. Gleick, E.L. Chalecki, and A. Wong (2002) Chapter 4: "Measuring Water Well-Being: Water Indicators and Indices," in P. H. Gleick, ed. *The World's Water, 2002-2003*, Washington, DC: Island Press, pp. 87-112.
G. Wolff and P.H. Gleick (2002) "The Soft Path for Water," in P. H. Gleick, ed., *The World's Water*, 2002-2003, Washington, DC: Island Press, pp. 1-30.
Success Stories:
Internet: U.S. EPA (September 2005) Section 319. Nonpoint Source Program Success Stories
Internet: U.S. EPA (2002) Section 319 Success Stories Volume III: The Successful Implementation of the Clean Water Act's Section 319 Nonpoint Source Pollution Program.
Blackboard: City of New York (December 2008) Sustainable Stormwater Management, Main report; appendices. New York, NY: City of NY.

V. AN INTEGRATED SYSTEM: GREENING THE GRAY CITY

Lecture 14. Synthesis and Discussion of Student Papers (December 13)

Integrating greener infrastructure into the life of cities – concepts and cases; interdependencies among physical components of energy, transportation, and water in cities; the role of communications and information technologies in the viability of alternative infrastructure technologies. What have we left out? Have we made a difference? Has investment changed the course of development of renewables?

Basic course themes and questions will be revisited, and students will be asked to contribute insights from their own papers.

Required Reading
Internet & Blackboard: (An example of moving technology forward) U.S. DOE (July 14, 2010) "The Recovery Act: Transforming America's Transportation Sector, Batteries and Electric Vehicles," Washington, DC: U.S. DOE, 8 pp.
http://www.whitehouse.gov/files/documents/Battery-and-Electric-Vehicle-Report-FINAL.pdf
Library online: (The information technology dilemma) Martin Hilbert and Priscila Lopez (2011) "The World's Technological Capacity to Store, Communicate and Compute Information," *Science*, Vol. 332, No. 60, pp. 60-65.

Optional
R. Zimmerman, "Making Infrastructure Competitive in a Changing World Through Investment," *The ANNALS of the American Academy of Political and Social Science*, Vol. 626, Issue 1, edited by S. Wachter and E. L. Birch. Philadelphia, PA: AAPSS, November 2009, pp. 226-241. doi: 10.1177/0002716209344842.

VI. Class Discussion of Papers continued (Hold December 20 – Fall Term Examination Period if necessary)