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PennDesign

PENN INSTITUTE for URBAN RESEARCH

THE ROCKEFELLER FOUNDATION

ISBN: 978-0-615-45706-2

THE PENN RESOLUTION

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Educating Urban Designers for Post-Carbon Cities

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The University of Pennsylvania School of Design (PennDesign) is dedicated to promoting excellence in design across a rich diversity of programs – Architecture, City Planning, Landscape Architecture, Fine Arts, Historic Preservation, Digital Media Design, and Visual Studies.

Penn Institute for Urban Research (Penn IUR) is a nonprofit, University of Pennsylvania-based institution dedicated to fostering increased understanding of cities and developing new knowledge bases that will be vital in charting the course of local, national, and international urbanization.

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WE ARE NOT GOING TO BE ABLE TO OPERATE OUR SPACESHIP EARTH SUCCESSFULLY NOR FOR MUCH LONGER UNLESS WE SEE IT AS A WHOLE SPACESHIP AND OUR FATE AS COMMON. IT HAS TO BE EVERYBODY OR NOBODY.

Buckminster Fuller

DESIGNING A DREAM CITY IS EASY. REBUILDING A LIVING ONE TAKES IMAGINATION.

Jane Jacobs

EDUCATION ISN'T LIKE FILLING UP YOUR CAR WITH GASOLINE AND THEN THINKING YOU'LL RUN FOR THE REST OF THE LIFE OF THE CAR ON THAT TANK OF GASOLINE.

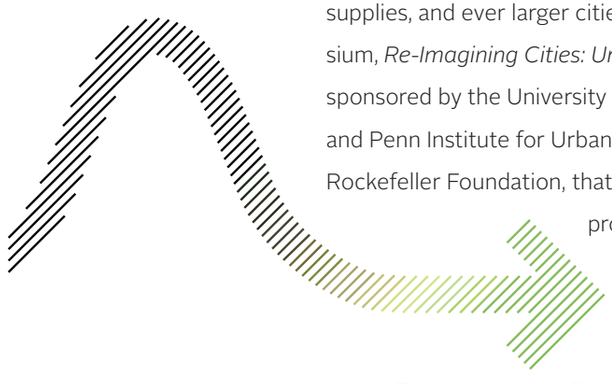
Gary Hack, Professor of Urban Design, Dean Emeritus, University of Pennsylvania School of Design

Contents

Introduction

William Penn, the founder of Philadelphia, titled his plan for the settlement "a greene country towne." He fashioned the city as the nation's original sustainable settlement. Houses rose along tree-shaded streets, and every household had a plot of land large enough to grow the food it needed. Even as the settlement expanded, all homes were within walking distance of shops, parks, squares and the places of public life.

Almost 320 years after Penn planned Philadelphia, urban designers from around the world gathered in his city to contemplate how to educate the planners of future sustainable settlements, in an era of global warming, declining energy supplies, and ever larger cities. They were attending a symposium, *Re-Imagining Cities: Urban Design After the Age of Oil,* sponsored by the University of Pennsylvania School of Design and Penn Institute for Urban Research and supported by the Rockefeller Foundation, that showcased innovative ideas, approaches, projects, and policies aimed at reducing emissions and fossil fuels. Symposium attendees contributed to *The Penn Resolution: Educating Urban Designers for Post-Carbon Cities,* a much-needed blueprint to guide urban design education for the twenty-first century.



The symposium also commemorated the 50th anniversary of an earlier Rockefeller-supported effort, the 1958 University of Pennsylvania *Conference on Urban Design Criticism*, which explored how to turn the controversial federal urban renewal program to less destructive and more humanistic ends. The two conferences have some similarities and several important differ-

Conference on Urban Design Criticism attendees in 1958 (left to right): William C. Wheaton, Lewis Mumford, Ian McHarg, John Brinckerhoff Jackson, David A. Crane, Louis Kahn, G. Holmes Perkins, Arthur C. Holden, Leslie Cheek Jr., Catherine Bauer Wurster, Chadbourne Gilpatric, Eleanor Larrabee, Jane Jacobs, Kevin Lynch, Gordon Stephenson, Nanine Clay, I.M. Pei

Image courtesy of Grady Clay

ences. Both assembled a broad range of designers and writers; both viewed urban design in its most expansive sense; and both called for innovations in the way cities conceive, adapt, develop, and manage themselves. The earlier conference took place against the backdrop of the optimistic and prosperous post-World War II era and emphasized the United States experience. In contrast, the later one occurred as urban dwellers became more than half of the world's population, when the threats of global warming were on the forefront of attention, and it emphasized the global reach of urban design.

Today, more than ever, people living in cities face seemingly intractable challenges, including bridging income divides, accommodating all in safe, healthy neighborhoods, and dealing with the looming energy crisis. In the future, global oil demand will outpace global oil supply. We debate only the date *when* world petroleum production will peak and begin to decline, not *whether* this will come to pass. With well over half of all energy used to build, operate, and live in the built environment, dramatic changes in the shape of the urban landscape seem inevitable.

Regardless of when the energy crisis occurs, massive reductions in carbon emissions are already imperative to minimize catastrophic climate change. Simply to stabilize carbon emissions at current levels, North Americans would have to reduce automobile travel by one-half and dramatically improve the energy performance of buildings, power generating stations, and all other carbon-emitting activities. In an era of exponen-

tial development and population growth in Asia and the Global South, the monumental task of re-imagining the design of the built environment is already a necessity.

To address these challenges, urban designers must rethink their basic premises, missions, and visions, and educators and professionals must translate their new thinking into effective training for future practitioners. *The Penn Resolution: Educating Urban Designers for Post-Carbon Cities* is a manifesto that begins this process. It lays out a set of principles to help guide the education of the next generation of urban designers.

This kind of forward-looking document has a proud heritage in urban design. Throughout the history of the field, manifestos have captured new ways of thinking about cities. Perhaps the most widely known is Le Corbusier's *Charte d'Athenes*

WE MUST PUT THE TWENTY-FIRST CENTURY CITY IN NATURE RATHER THAN PUT NATURE IN THE CITY. TO PUT A CITY IN NATURE WILL MEAN USING ENGINEERED SYSTEMS THAT FUNCTION AS THOSE IN NATURE AND DERIVING FORM FROM THEM.

Diana Balmori, Founding Principal, Balmori Associates; William Henry Bishop Visiting Professor of Architectural Design, Yale University

(1943), based on discussions from the fourth *Congress International d'Architecture Moderne* (CIAM) held ten years earlier. It set out a series of observations about the contemporary city and resolutions for its improvement. The utopian vision articulated in the *Charte d'Athenes*—of modern, high-density towers surrounded by green space and connected by highly engineered transportation networks, with industrial and residential uses segregated—had an enormous impact on mid-twentieth-cen-

DESIGN EDUCATION NEEDS REVAMPING — ESPECIALLY ARCHITECTURE AND ESPECIALLY THE DESIGN STUDIO, THE BACKBONE OF MOST PROGRAMS. THE INTRODUCTORY STUDIO PROJECT AT MOST SCHOOLS IS STILL A SMALL, SIMPLE BUILDING (WHICH IS FINE), FREE-STANDING (WHICH IS NOT AS FINE), TYPICALLY ON AN ABSTRACTED OR OPEN SITE. I THINK IT WOULD BE BETTER TO START ARCHITECTURAL DESIGN EDUCATION WITH A SMALL SIMPLE BUILDING ON AN URBAN INFILL SITE. THIS IS LITERALLY A FIGURE/GROUND REVERSAL — LESS FIGURE, MORE GROUND. PUTTING THE CITY FIRST AND THE BUILDING SECOND SENDS THE RIGHT MESSAGE. LATER STUDIOS NEED TO CREATIVELY FOCUS ON REAL PROBLEMS RATHER THAN ON INVENTED PROBLEMS AND CREATIVITY FOR ITS OWN SAKE.

Douglas S. Kelbaugh, Professor of Architecture and Urban Planning, University of Michigan

1. Gary Hack, Professor of Urban Design, Dean Emeritus, University of Pennsylvania School of Design, opens the symposium. The symposium committee dedicated it to Dean Hack.

2. Tanner Oc, Professor of Urban Design and Planning, and Director, Institute of Urban Planning, School of the Built Environment, University of Nottingham; and Sudeshna Chatterjee, Principal, Kaimal Chaterjee & Associates, New Delhi

3. Robert Buckley, Managing Director, Rockefeller Foundation; Eugénie L. Birch, Co-Director and Nussdorf Professor, Penn Institute for Urban Research

4. Rodrigo Pérez de Arce, Professor, Architecture, Design and Urban Studies, Pontifical Catholic University of Chile; Ding Wowo, Dean, School of Architecture, Nanjing University; Marilyn Jordan Taylor, Dean and Paley Professor, University of Pennsylvania School of Design; Tanner Oc, Professor of Urban Design and Planning, and Director, Institute of Urban Planning, School of

the Built Environment, the University of Nottingham; Sudeshna Chatterjee, Principal, Kaimal Chatterjee & Associates, New Delhi; Douglas Kelbaugh, Professor of Architecture and Urban Planning, University of Michigan

5. Conference attendees

6. Robert Socolow, Professor of Mechanical and Aerospace Engineering; Co-Director, The Carbon Mitigation Initiative, Princeton University, co-author of the "wedge theory"

7. Darren Walker, Vice President, Rockefeller Foundation

8-9. The exhibition featured voting pavilions to gauge public opinion about various sustainable design choices.

10. Conference attendees

tury urban design. In fact, it would be the underlying philosophy of the US federal urban renewal projects that the participants in the *Conference on Urban Design Criticism* would question, leading to an abundance of paradigm-changing research and writing undertaken by such attendees as Kevin Lynch (*Image of the City* [1960]), Jane Jacobs (*The Death and Life of Great American Cities* [1961]), and Ian McHarg (*Design With Nature* [1969]).

Together, Jacobs, Lynch, and McHarg, along with other like minded theorists, would transform urban design approaches. Jacobs replaced the functional segregation of *Charte d'Athenes* urbanism with an appreciation for city fabric characterized by the integration of living, working, recreation, and transportation. Lynch showed how memorable places, distinct identities were tied to the existence of landmarks, nodes, districts, and paths, and in a later book, *Good City Form* (1984), he codified these and other mid-twentieth-century urban design theories into six performance dimensions. Good cities, Lynch argued, have *vitality*; are organized so that they make *sense* in the mind; *fit* the life patterns of those using them; have easy *access*; allow residents to *control* their development; and balance *efficiency* and *justice*. Meanwhile, Ian McHarg, whose Rockefeller Foundation-supported research was early in its development in the late 1950s, redefined the boundaries between the natural and built environments with *Design With Nature*.

Nevertheless, *Charte d'Athenes* urbanism would be replaced by sprawling low-density subdivisions and disinvested central cities, and a new responsibility for urban design would emerge. Influenced by these earlier works, Allan Jacobs and Don Appleyard penned "Toward an Urban Design Manifesto" (1987), positing five essential characteristics of the good urban environment: livable streets and neighborhoods; dense residential development; a mix of uses; a built environment that defines public space; and a relatively fine-grained, complex pattern of development. Their manifesto helped crystallize a new form of urban design.

Complimenting this work, a decade later, the Congress for the New Urbanism, a group founded by Andres Duany, Elizabeth Plater-Zyberk, Peter Calthorpe, and others reacted to the continued decline in public space with a new manifesto, *The Charter of the New Urbanism* (1996), which espoused principles of urban design organized around three increasingly fine scales of development: the metropolis, city, and town; the neighborhood, district, and corridor; and the block, street, and building. These principles expressed a philosophy of urban design that was based on walkability, harkening back to pre-twentieth-century, and pre-petroleum-age, patterns of development. The beliefs embodied in this manifesto had expression in a variety of suburban and urban venues, notably the HOPE VI experiments of the first decade of the twenty-first century.

HOW DO WE EDUCATE THE NEXT GENERATION OF URBAN DESIGNERS, WHOSE JOB IT WILL BE TO INTEGRATE ALL THESE NEW IDEAS AND TECHNOLOGIES INTO SOME SORT OF CITY FORM, CITY SPACE, THAT IS LIVABLE, THAT IS ENDURING, THAT IS SUSTAINABLE?

Sudeshna Chatterjee, Principal, Kaimal Chatterjee & Associates, New Delhi

Today, as cities grow to unprecedented sizes around the world, the challenges are even greater than those of the early and late twentieth century. It will take heroic efforts to stabilize carbon emissions in the wealthiest countries of the world, as Robert Socolow emphasized in his keynote talk at the symposium, and even with stabilization, average temperatures will rise at least 2° C. Since the symposium, national governments have made commitments to go even further. The US pledged in Copenhagen to reduce carbon emissions by 83 percent by 2050. Rapidly developing countries such as China have pledged to cut the carbon intensity of their expanding GDP by as much as 45 percent. Achieving these targets will require all the dedication and ingenuity that professionals can muster over the next several decades.

With this in mind, *The Penn Resolution: Educating Urban Designers for Post-Carbon Cities* has an explicit goal of outlining the educational requisites for students and current practitioners. Like its predecessors, it encompasses design on varying scales but does not prescribe precise details. Instead, it lists areas of needed knowledge and underlines the need for basic ecological research to inform design decisions. Finally, it assumes that the design of the post-carbon city will call for the skills of many different design professions — the architect, city planner, engineer, historic preservationist, and landscape architect — and associated disciplines.

We present the resolution in full on the pages that follow, accompanied by examples of innovative practices, many of which were presented in detail at the symposium. Except where noted, all quotations are from symposium speakers or selections from white papers submitted after the conference.

We end here, noting that by 2030, when today's students are in the midst of their careers, two-thirds of the world's population will live in cities. How they design cities will increasingly determine the future of our world. How we educate professionals will determine whether that future is worth living.

Gary Hack
Eugénie L. Birch
Peter L. Laurence

The Penn Resolution: Educating Urban Designers for Post-Carbon Cities

Changing climate patterns and diminishing supplies of inexpensive oil require us to design our cities in radically different ways. Reducing energy usage and carbon emissions is necessary to limit global warming, address severe weather events and rising sea levels, and face the threats of reduction of food production, loss of biodiversity, and dependence on unreliable energy suppliers.

These problems are urgent, global, and closely linked. Their convergence forces us as professionals concerned with building cities to rethink our basic premises, mission, and vision.

The Challenge

1. We must engage in sustainable design at all scales from urban regions to neighborhoods to buildings and landscapes to the products we use for building and inhabiting cities.

2. We need to develop effective strategies for mitigation, adaptation, and new sustainable construction, and master the obstacles to their implementation.

3. We must develop better means for ongoing measurement of the environmental performance of buildings, landscapes, and urban areas.

4. We must acknowledge that while we are all sustained by the same atmosphere and natural resources, and draw upon the same supplies of energy, our responses to the current situation

will vary greatly depending upon each society's level and pattern of development.

5. We, in societies with greater material resources, will need to reduce carbon emissions and conserve energy aggressively to create room for the economic advancement of lower-resource societies. We, in less developed countries, need to avoid the mistakes of over reliance on energy from fossil fuels and excessive carbon emissions.

Fundamental Principles

6. No single design profession can address the issues of global warming and reduction of energy supplies. Instead, urban designers, architects, city planners, landscape architects, product designers, and engineers must work collaboratively to reformulate urban patterns. To this end we must:

- integrate a fundamental concern for our natural environment into our instruction and practice;
- sponsor research that not only uncovers innovative approaches but also evaluates performance; and
- promote collaborative practices, sharing of knowledge, and use of common language among our disciplines and other contributors, particularly ethnographers, ecologists, historians, environmental scientists, materials scientists, economists, and entrepreneurs.

7. Urban design educators and practitioners need to expand their concerns to anticipate the local and global impacts of design decisions. In addition to heeding environmental impacts, we need to be conscious of the needs and views of diverse populations, especially low-income groups in the Global South and North. To this end we must:

- recognize that, in addition to current or paying clients, we have a responsibility to future inhabitants of the planet;
- pursue a mandate to make things green on a per capita basis;
- think systemically rather than solely in terms of projects; and
- develop visions collaboratively and cross-culturally.

Urban Design Education

8. Students of all of the disciplines that shape the urban environment need to be educated about the imperatives of designing the post-carbon city. They also need to be prepared for a diverse set of roles that will include designer, advocate, critic, organizer, mediator, visionary and creative artist as conditions demand — to become full citizens of both their local communities and the globe.

9. The education for the new urban design professional should be organized around several purposes:

- developing an understanding of the political, philosophical, and moral implications of the practice of shaping post-carbon cities;
- cultivating the capacity to envision new urban patterns that embrace ecological complexity, economic sustainability, and social justice, and recognizing that these are sometimes competing objectives;

• developing an understanding of the performance of sites' natural systems over time;

• allowing design studios to serve as crucibles for learning, collaboration across disciplines, and interaction with clients and citizens; and

• continuing to develop the traditional skills of conceptualizing and rendering urbanization in all of its dimensions — the relationship between subdivision and land ownership; lots and blocks; building types; the regulatory regime; the infrastructure needed to support settlement; the form, design, activities, and uses of public spaces; the visual and experienced character of places; and the development process.

10. Added to this core of knowledge, future urban designers will need to acquire new skills so that they are able to:

• calculate ecological and carbon footprints at several levels — individual, building, neighborhood, city, and region — and distinguish those designs, urban forms, and everyday practices that minimize the footprints;

• estimate the space and facility requirements at several scales to generate and use energy from alternative sources, to recycle rain and wastewater, to collect and reuse organic waste, and to grow food locally;

• converse knowledgeably with the technical experts on sustainable infrastructure systems, and to integrate these technologies and urban forms;

• understand environmental economics, including markets for alternative energy, the role of incentives and taxes in conservation, financing vehicles and other essentials that impact the ability to change behavior and development processes;

• design circulation systems, especially mass or shared transit, including systems for nonmotorized vehicles and pedestrians of diverse abilities, understanding how the need for mobility is changing with new information and communication technologies;

• understand the economics and urban densities required to support and integrate alternative-fuel mass transit and vehicles;

• understand the complexity of density (including an understanding of cultural factors in prescribing density, the implication of different densities on infrastructure costs, and learning how to quickly estimate the densities of sketch designs) and design strategies for integrating higher densities into existing cities;

• formulate design guidelines, building codes, and zoning regulations that ensure public health, promote transit access and walkability, reduce the use of and/or generate energy on-site, limit runoff, CO_2 and wastes, encourage use of local materials, and accomplish other sustainable development objectives;

• communicate effectively, employing traditional graphic and verbal skills, supplemented with new video, sound, and voice technologies integrated into multimedia presentations, and making projects readily available via the World Wide Web; and

• identify and interact with diverse interests, mediate differences, and undertake negotiation and consensus-building to reach agreement among different constituencies in the face of new global energy and climate challenges.

11. The new urban designer will need to feel comfortable operating under conditions of ambiguity, appreciating the fact that the science and art of integrating sustainability into urban design is an evolving challenge requiring the adaptation and advancement of ideas as they emerge.

12. Current working professionals also need to quickly acquire an understanding of the essentials of sustainable design. New part-time degree and certificate programs, professional development courses, conferences, workshops, and charrettes should be offered to current practitioners to increase their capacity to employ holistic approaches to sustainable design and to learn the new skills in design curricula suggested here. Once informed about issues of urban sustainability and retrained in the use of new media (print, film, video and the internet), design professionals will have the standing to engage communities, politicians, developers, scientists, and economists, and to lead the public discourse.

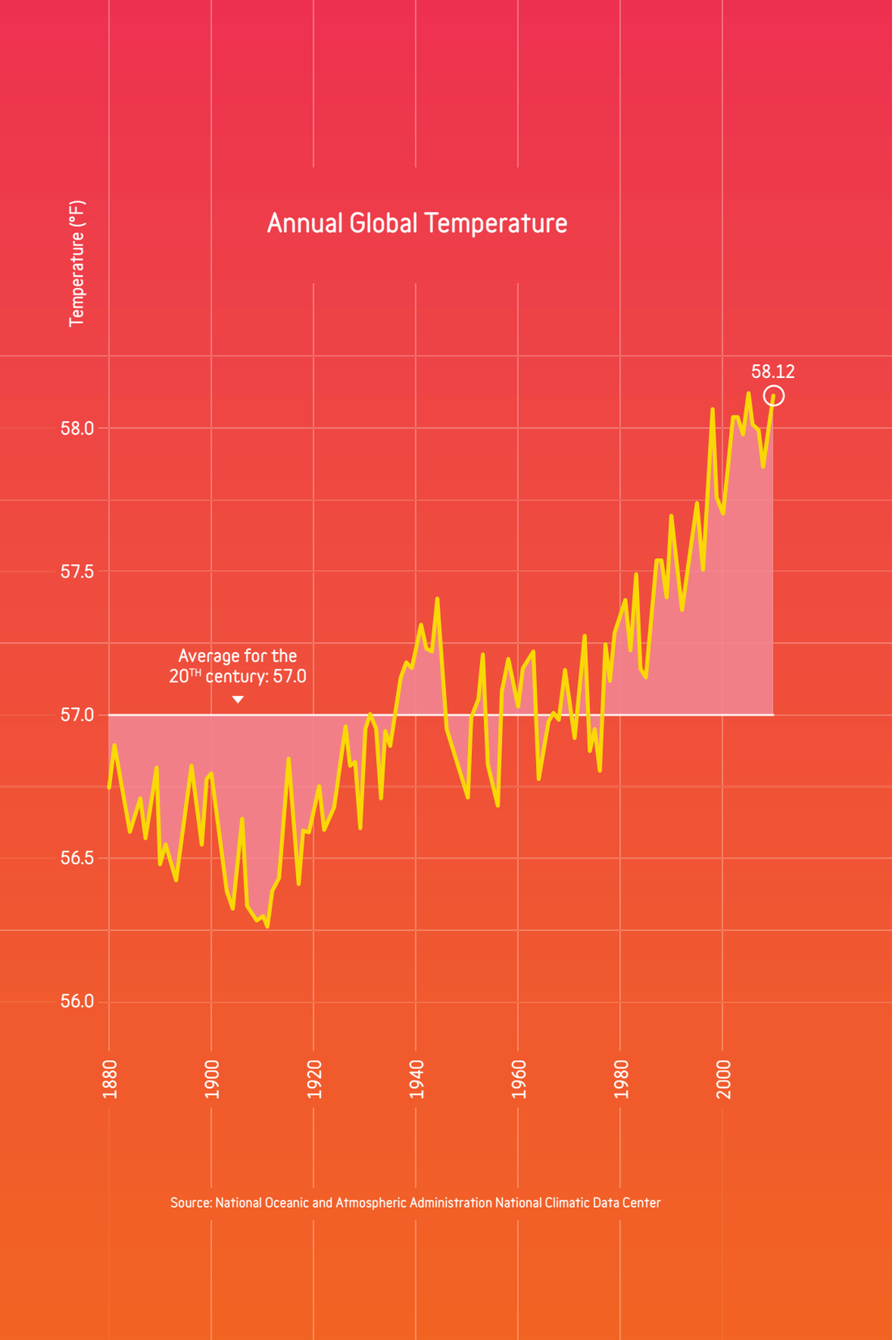
Expanding the Knowledge Base

13. There is a need for concrete knowledge on environmental performance, at a level of specificity that reduces the need for speculation. With thousands of experiments across the globe in constructing more sustainable communities, there is ample opportunity for measuring performance over time. These studies need to be compiled and made available to design professionals via the internet.

14. Every university educating urban designers ought to commit itself to contributing to this base of knowledge. Urban design education programs should also sponsor innovative research and methodological speculation that may not always have immediate application to current projects. This may involve ecological impact modeling that cuts across political and programmatic boundaries or developing speculative scenarios to compel citizens to become active participants in transforming their cities.

The ultimate role of the urban designer is to be someone who is able to describe potential futures for the city in visual, technical, and narrative terms that foster the social involvement, political action, and economic investment to make the post-carbon city a reality.

The Penn Resolution



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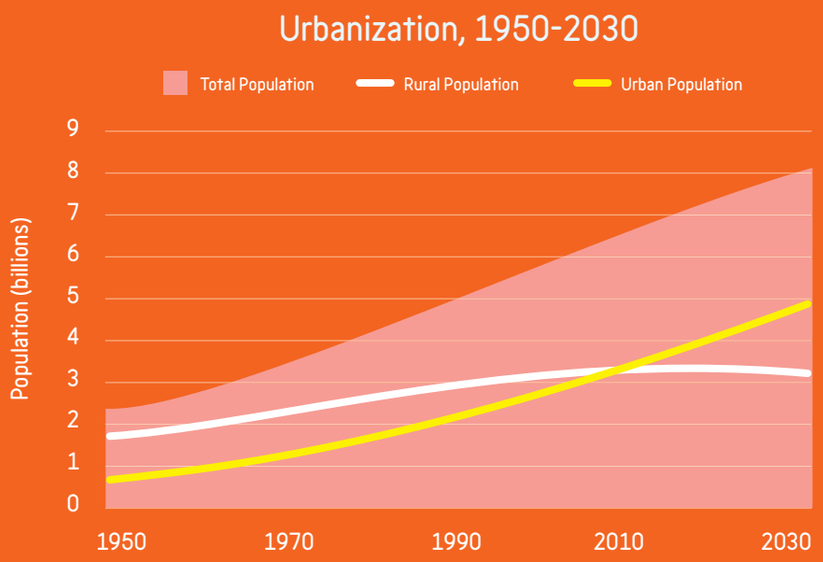
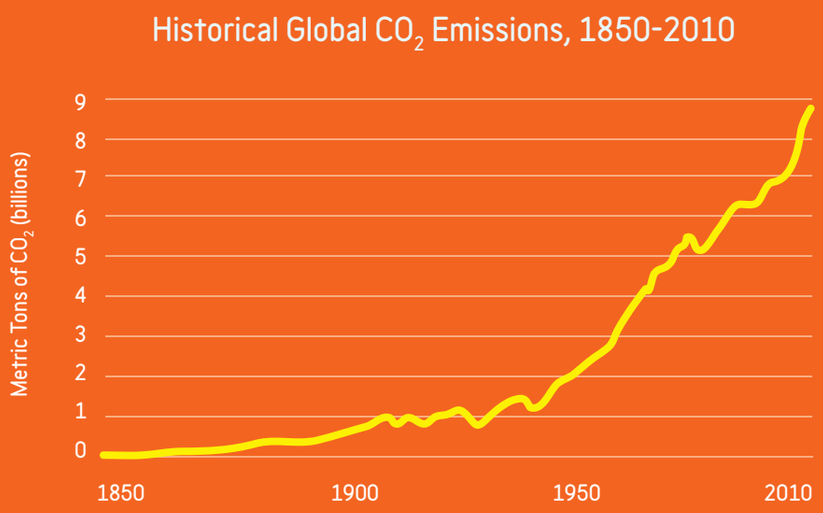
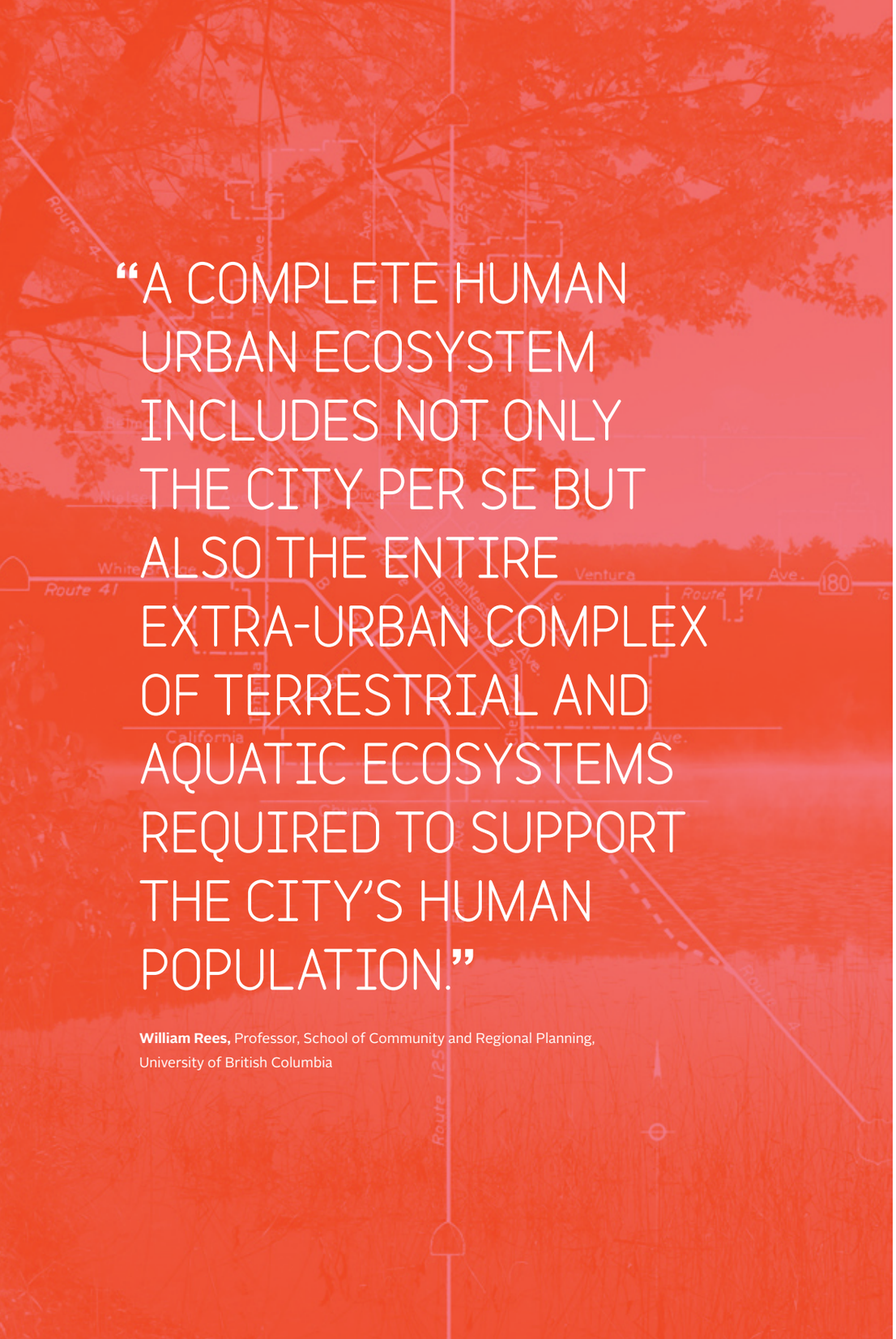


Source: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm



Source: CO2 Emissions Data from Carbon Dioxide Information Analysis Center (CDIAC, http://cdiac.ornl.gov/)

The Challenge



“A COMPLETE HUMAN URBAN ECOSYSTEM INCLUDES NOT ONLY THE CITY PER SE BUT ALSO THE ENTIRE EXTRA-URBAN COMPLEX OF TERRESTRIAL AND AQUATIC ECOSYSTEMS REQUIRED TO SUPPORT THE CITY’S HUMAN POPULATION.”

William Rees, Professor, School of Community and Regional Planning, University of British Columbia

1

We must engage in sustainable design at all scales from urban regions to neighborhoods to buildings and landscapes to the products we use for building and inhabiting cities.

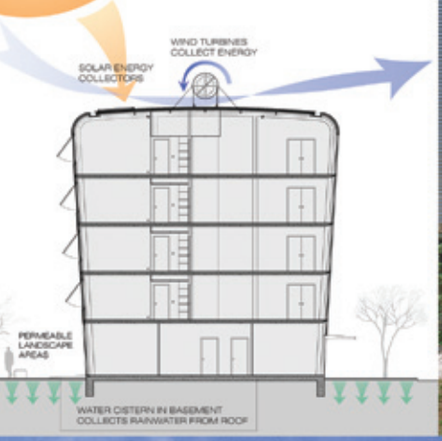
LILYPAD FLOATING ECOPOLIS

Lilypad is a floating, self-sufficient city – an "Ecopolis" – designed to address the looming problem of rising sea levels. Conceived by Belgian architect Vincent Callebaut, this structure can accommodate 50,000 residents, generate its own energy, recycle wastewater, and meet its own food needs. The island is meant to be used by both developed and less-developed countries; it can extend the territory of the most developed countries and can house the climatic refugees of less-developed, at-risk marine territories. Lilypad represents a new biotechnological model of ecological resilience, sustaining nomadic and urban environments in the face of drastic climate change.

Image courtesy Vincent Callebaut Architectures

2

We need to develop effective strategies for mitigation, adaptation, and new sustainable construction, and master the obstacles to their implementation.



Images courtesy of Murphy/Jahn; photos by Doug Snower

"I THINK THAT WHAT WE HAVE DONE IN THE LAST 100 YEARS OF URBANIZATION HAS ACTUALLY BEEN SO HEAVILY INTERVENTIONIST THAT WE HAVE IN FACT OBSCURED THE RELATIONSHIP BETWEEN HUMAN BEINGS AND NATURE."

K.T. Ravindran, Professor and Head of the Department of Urban Design, School of Planning and Architecture, New Delhi

SCHIFF RESIDENCES
CHICAGO, UNITED STATES

The Margot and Harold Schiff Residences in Chicago comprise 96 apartments averaging 300 square feet. Built for limited-income, formerly homeless, and disabled persons, the project addresses the needs of low-income groups while incorporating a number of green strategies. Roof-mounted aeroturbines generate power for the building, which was shaped to maximize wind to the aeroturbines. The building also uses solar thermal collectors, a rainwater reclamation system, and a water system that recycles shower-water to flush toilets.

"WE NEED TO KNOW NOT JUST HOW MUCH ENERGY A BUILDING REQUIRES, BUT WHAT'S POWERING THE GRID THAT SUPPLIES THAT ENERGY. WE NEED TO KNOW NOT JUST HOW MANY MILES-PER-GALLON OUR CAR ACHIEVES, BUT HOW THAT EXPENDITURE FITS INTO THE OVERALL PICTURE OF OUR ENERGY-USE PATTERNS. A CLEAR VIEW OF THE LARGER PICTURE ... IS NECESSARY IF JUSTICE IS TO BE DONE TO THE GROWING ENERGY DEMANDS OF THE DEVELOPING WORLD AND THE WORLD'S POOREST CITIZENS."

Robert Socolow, Professor, Mechanical and Aerospace Engineering; Co-Director, The Carbon Mitigation Initiative, Princeton University

3

We must develop better means for ongoing measurement of the environmental performance of buildings, landscapes, and urban areas.

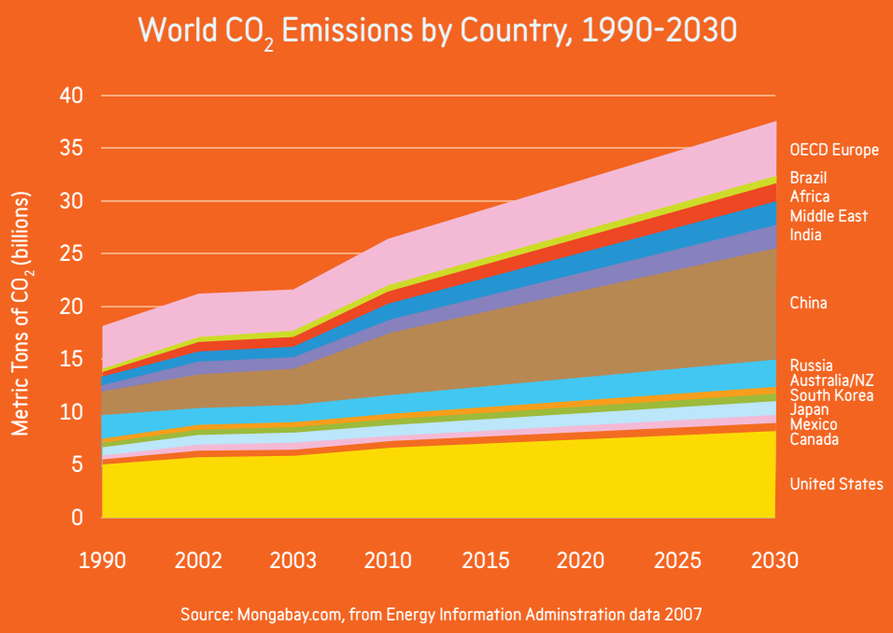
COPENHAGEN BIKING
COPENHAGEN, DENMARK

Already known for its widespread cycling culture, Copenhagen has set its sites even higher: to become the world's most bike-friendly city. The city has set ambitious goals to make this happen. By 2015, Copenhagen expects that at least half of the city will commute to work or school; the number of cyclists seriously injured in traffic will be cut in half; at least 80 percent of Copenhagen cyclists will feel safe in traffic; and a new bike-share system will be established.

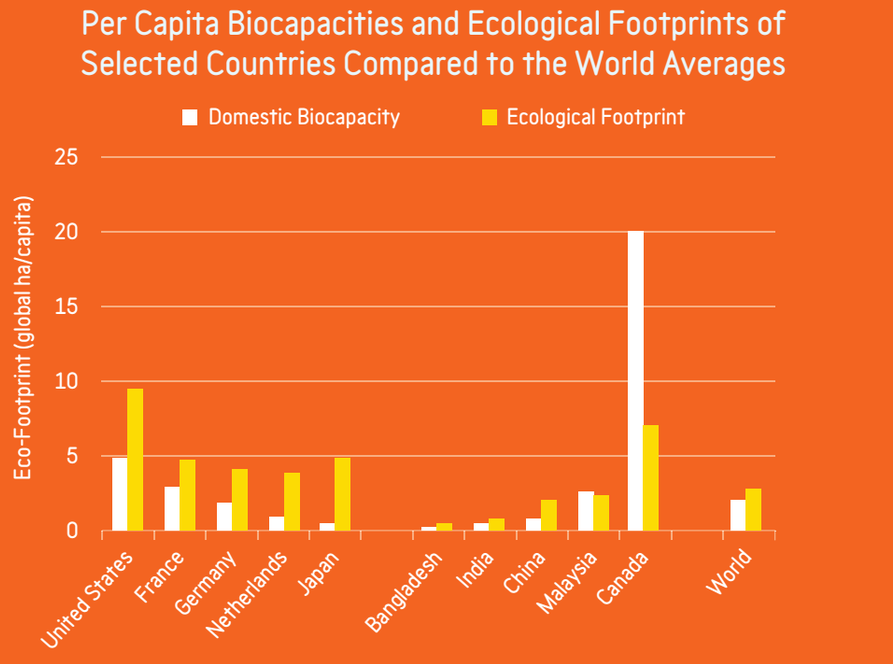
Images courtesy of Mikael Colville-Andersen / CopenhagenCycleChic.com

"I DO THINK THAT WE NEED TO MAKE AN EFFORT — WHETHER WE'RE DESIGNERS, URBAN DESIGNERS, PLANNERS — TO BEGIN TO DESIGN INFORMATION ABOUT WHAT WE DO AND ABOUT THE ISSUES THAT HAVE COME UP HERE, SO THAT CHILDREN AND THE GENERAL PUBLIC HAVE AN IDEA OF WHERE WE ALL SHOULD GOING TOGETHER, BECAUSE IF IT STAYS ONLY IN THIS GROUP THOSE THINGS JUST WILL NOT HAPPEN."

Karen Van Lengen, Dean, University of Virginia Architecture School; Edward E. Elson Professor of Architecture, University of Virginia



Source: Mongabay.com, from Energy Information Adminstration data 2007



Source: 2005 data extracted from WWF 2008; from William Rees,
Cities After Oil: Getting Serious About Urban Sustainability

4

We must acknowledge that while we are all sustained by the same atmosphere and natural resources, and draw upon the same supplies of energy, our responses to the current situation will vary greatly depending upon each society's level and pattern of development.

“THE CONDITIONS ARE NO LONGER WHAT THEY WERE, AND WE HAVE TO RADICALLY RETHINK OUR BASIC PREMISES, OUR MISSIONS AND OUR VISIONS.”

David Leatherbarrow, Professor of Architecture, University of Pennsylvania School of Design

RETHINK → OUR LANDSCAPE

“WE SHOULD THINK OF URBAN DESIGN AND LANDSCAPE AS AN ART OF SURVIVAL.”

Kongjian Yu, Dean, Graduate School of Landscape Architecture, Peking University; Founder and President, Turenscape

Images courtesy of Mikyoung Kim

CHEONGYECHEON
SEOUL, SOUTH KOREA

The Cheongyecheon stream is a daylit stream and public recreation space in Seoul, South Korea. Once an open stream bisecting the city, the waterway became polluted and was slowly covered by development in the middle of the twentieth century. A massive $400 million restoration project removed a 40-year-old elevated highway and created a six-kilometer linear park through the heart of Seoul. Several landscape architecture firms designed sections of the stream; the large image depicts a fountain in ChonGae Canal Park, designed by Mikyoung Kim, that celebrates the source of the watercourse.

"IF YOU LOOK INSIDE THE GLOBAL SOUTH SLUMS, YOU DON'T FIND JUST THE DEPRIVATION PICTURE, YOU ALSO FIND A BEEHIVE OF ACTIVITY, PEOPLE CAUGHT IN POVERTY TO BE SURE BUT WORKING AS FAST AND INDUSTRIOUSLY AS THEY CAN TO IMPROVE THEIR LIVES."

Neal Peirce, Chairman, Citistates Group

"COMMUNITIES OF PRIVILEGE MAY OR MAY NOT DESIGN THEIR WAY OUT OF THIS MESS, BUT COMMUNITIES OF POVERTY ARE DEMONSTRATING THE FIRST LESSON OF SURVIVAL — NECESSITY IS THE MOTHER OF INVENTION. A BRIGHTER FUTURE WILL COME NOT BECAUSE WE WANT IT — IT WILL COME BECAUSE WE NEED IT."

Lance Hosey, Director, William McDonough + Partners

5

We, in societies with greater material resources, will need to reduce carbon emissions and conserve energy aggressively to create room for the economic advancement of lower-resource societies. We, in less developed countries, need to avoid the mistakes of over reliance on energy from fossil fuels and excessive carbon emissions.

“PLANNING THAT UNDERSTANDS AND PROPERLY VALUES NATURAL PROCESSES MUST START WITH THE IDENTIFICATION OF THE PROCESSES AT WORK IN NATURE.”

Ian McHarg

Fish Passage
Stream Daylighting
Stream Restoration
Tidal Mudflat - Wetland Res
Wetland Creation
Wetland Enhancement

GREEN CITY / CLEAN WATERS
PHILADELPHIA, UNITED STATES

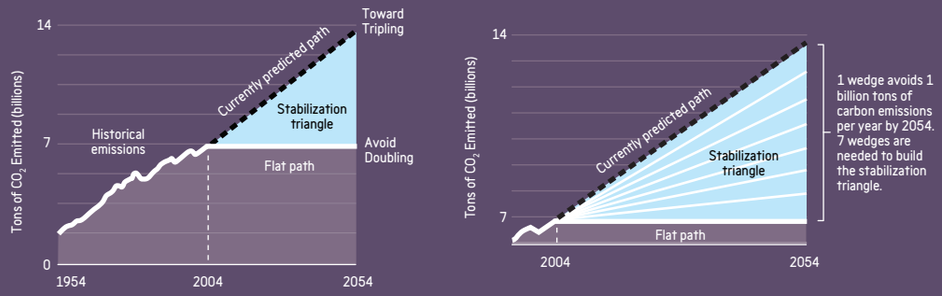
Green Cities, Clean Waters is Philadelphia's twenty-year plan to improve and protect the city's waters. By investing in green stormwater infrastructure, Philadelphia intends to manage stormwater in order to reduce combined sewer overflows (CSOs) and protect water resources. Philadelphia will couple these investments in stormwater infrastructure with stream corridor restoration and preservation, and with treatment plant upgrades.

Images courtesy Philadelphia Water Department

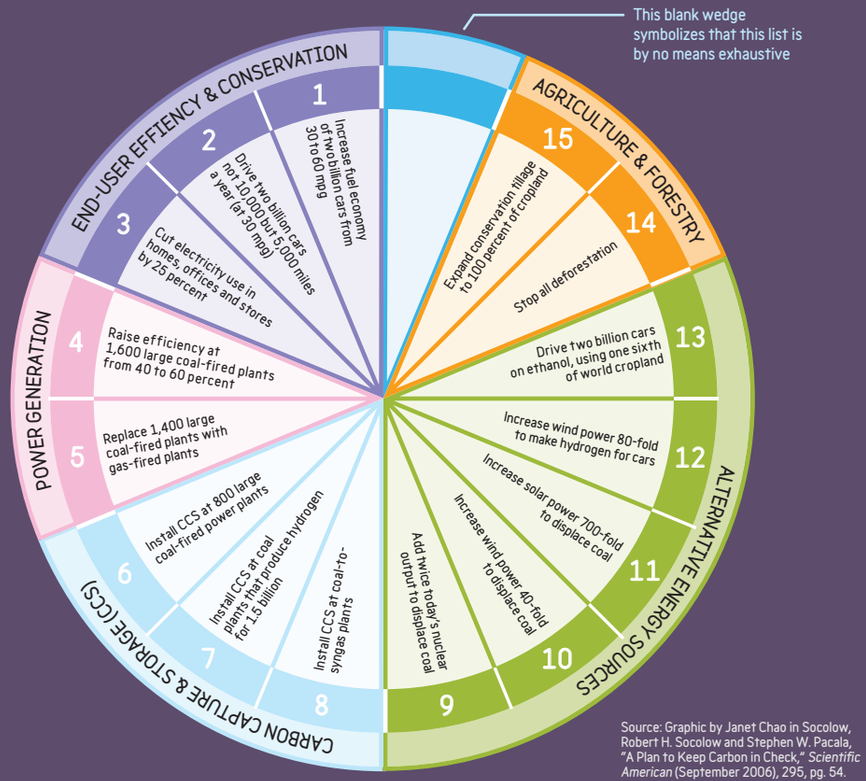
Medellín Metrocable, Medellín, Colombia

Image courtesy of Caitlin Bowler

Fundamental Principles



Souece: Socolow, R., R. Hotinski, J.B. Greenblatt, and S. Pacala, "Solving the Climate Problem: Technologies Available to Curb CO2 Emissions," *Environment* (December 2004), vol. 46, no. 10, pg. 11.



Source: Graphic by Janet Chao in Socolow, Robert H. Socolow and Stephen W. Pacala, "A Plan to Keep Carbon in Check," *Scientific American* (September 2006), 295, pg. 54.

STABILIZATION WEDGES

The "stabilization wedge" is a tool to help conceptualize the emissions cuts needed to avoid dramatic climate change. It illustrates two scenarios over the next fifty years: one in which emissions double (considered a reasonable estimate of our current path), and one in which emissions hold steady at today's rates. The difference between the currently predicted path and the flat path (pictured above by the black, upward-sloping path and the white, flat line, respectively) is shown as a triangle representing emissions that can be avoided. This "stabilization triangle" is then divided into smaller triangles — or "wedges" — each representing a carbon-cutting strategy, such as the use of wind-energy or carbon sequestration. Fifteen carbon-reduction strategies have been examined, each of which is based on known technology.

6

No single design profession can address the issues of global warming and reduction of energy supplies. Instead, urban designers, architects, city planners, landscape architects, product designers, and engineers must work collaboratively to reformulate urban patterns. To this end we must:

- integrate a fundamental concern for our natural environment into our instruction and practice;
- sponsor research that not only uncovers innovative approaches but also evaluates performance; and
- promote collaborative practices, sharing of knowledge, and use of common language among our disciplines and other contributors, particularly ethnographers, ecologists, historians, environmental scientists, materials scientists, economists and entrepreneurs.

Images courtesy of Postgreen; top-right photo by Sam Oberter

"WE NEED TO DEVELOP A DESIGN STUDIO PEDAGOGY THAT REALLY ENABLES THIS KIND OF WORK TO HAPPEN. THIS IS A WICKED PROBLEM, BECAUSE IN ORDER TO MAKE ALL OF THE DISCIPLINES EFFECTIVE, YOU HAVE TO GIVE THEM EFFECTIVE ANALYSES — THAT WAY, WHEN WHEN THEY SPEAK WITH EACH OTHER THEY'RE REALLY CONTRIBUTING TO THE SOLUTION, NOT JUST TWIDDLING THEIR THUMBS. IT'S VERY HARD TO DO SINCE EACH DISCIPLINE SPEAKS ITS OWN LANGUAGE AND HAS ITS OWN ANALYTICAL TOOLS."

Harrison Fraker, Professor of Architecture and Urban Design, University of California, Berkeley

100K HOUSE
PHILADELPHIA, UNITED STATES

The 100K House Project is an effort to build modern, green homes in Philadelphia affordably — for $100,000 in construction costs and with a sale price of $200,000. A collaboration between an architect and a developer, the project strives to erase urban blight, incorporate modern architecture in traditional communities, build ecologically responsible structures, provide affordable homes to Philadelphians, and draw references from Philadelphia's dominant urban forms. The flagship home is LEED Platinum certified and won the USGBC's LEED for Homes Project of the Year Award in Fall 2010. It has been lived in for over a year and a half.

DHARAVI RECYCLING
MUMBAI, INDIA

Dharavi is one of Mumbai's (and Asia's) largest slums, yet it contains a thriving recycling industry. Here, thousands of micro-entrepreneurs turn around the discarded waste of Mumbai's 19 million citizens. Thousands of workers melt and remold plastic. Soap-makers reprocess soap from hotels and schools for reuse. An oil-can recycling industry (pictured here) cleans and sells oil cans for re-use. The impact of this economic development project demonstrates the importance of engaging multiple professions in reformulating urban patterns.

Image courtesy of Adrian Fisk

7

Urban design educators and practitioners need to expand their concerns to anticipate the local and global impacts of design decisions. In addition to heeding environmental impacts, we need to be conscious of the needs and views of diverse populations, especially low-income groups in the Global South and North. To this end we must:

- recognize that, in addition to current or paying clients, we have a responsibility to future inhabitants of the planet;
- pursue a mandate to make things green on a per capita basis;
- think systemically rather than solely in terms of projects; and
- develop visions collaboratively and cross-culturally.

Image © Adrian Smith + Gordon Gill Architecture

"WHAT ON EARTH DOES [MOVING TO AN ECOLOGICAL AGE] MEAN IN HIGH-INCOME COUNTRIES LIKE THE UNITED STATES? IT MEANS … CITY RETROFITTING, IT MEANS LITERALLY CHANGING EVERY STREET, EVERY BUILDING, THE WAY PEOPLE LIVE, CHANGING THE CULTURE, AND RECONNECTING URBAN AND RURAL RESOURCE FLOWS, SOMETHING WE'VE COMPLETELY FORGOTTEN ABOUT."

Peter Head, Global Leader of Planning and Project Director of Eco-City Master Planning, Arup; Commissioner, London Sustainable Development Commission

CHICAGO CENTRAL AREA DECARBONIZATION PLAN
CHICAGO, UNITED STATES

The Chicago Central Area DeCarbonization Plan is an effort to make "The Loop," or Chicago's central city area, carbon neutral. Architecture firm Adrian Smith + Gordon Gill Architecture, which developed the plan for the City of Chicago, has assessed the energy use of the more than 500 buildings within the study area, proposing strategies to improve energy performance, including a proposal to retrofit more than half the buildings. The plan aims to reduce the area's carbon footprint by 25 percent below 1990 levels by 2020 and by 100 percent for new and renovated buildings by 2030.

Popular Gardens, Havana, Cuba

Image courtesy of Ed Weston

Urban Design Education

BEDZED
LONDON, UNITED KINGDOM

The Beddington Zero Energy Development, or BedZED, is a mixed-use development built on a brownfield site in London. The development includes 92 dwellings (a mixture of flats, maisonettes, and town houses), more than 2,500 square meters of workspace, office, and community accommodation, as well as an on-site nursery, a community hall with changing rooms, and an exhibition center of renewable technologies. The BedZED urban system reconciles high-density three-story city blocks with residential and workspace amenities. Workspace is placed in the shade zones of south-facing housing terraces, with skygardens created on the workspace roofs, enabling all flats to have outdoor garden areas with good access to sunlight.

Images courtesy of www.zedfactory.com & www.ruralzed.com

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Students of all of the disciplines that shape the urban environment need to be educated about the imperatives of designing the post-carbon city. They also need to be prepared for a diverse set of roles that will include designer, advocate, critic, organizer, mediator, visionary and creative artist as conditions demand — to become full citizens of both their local communities and the globe.

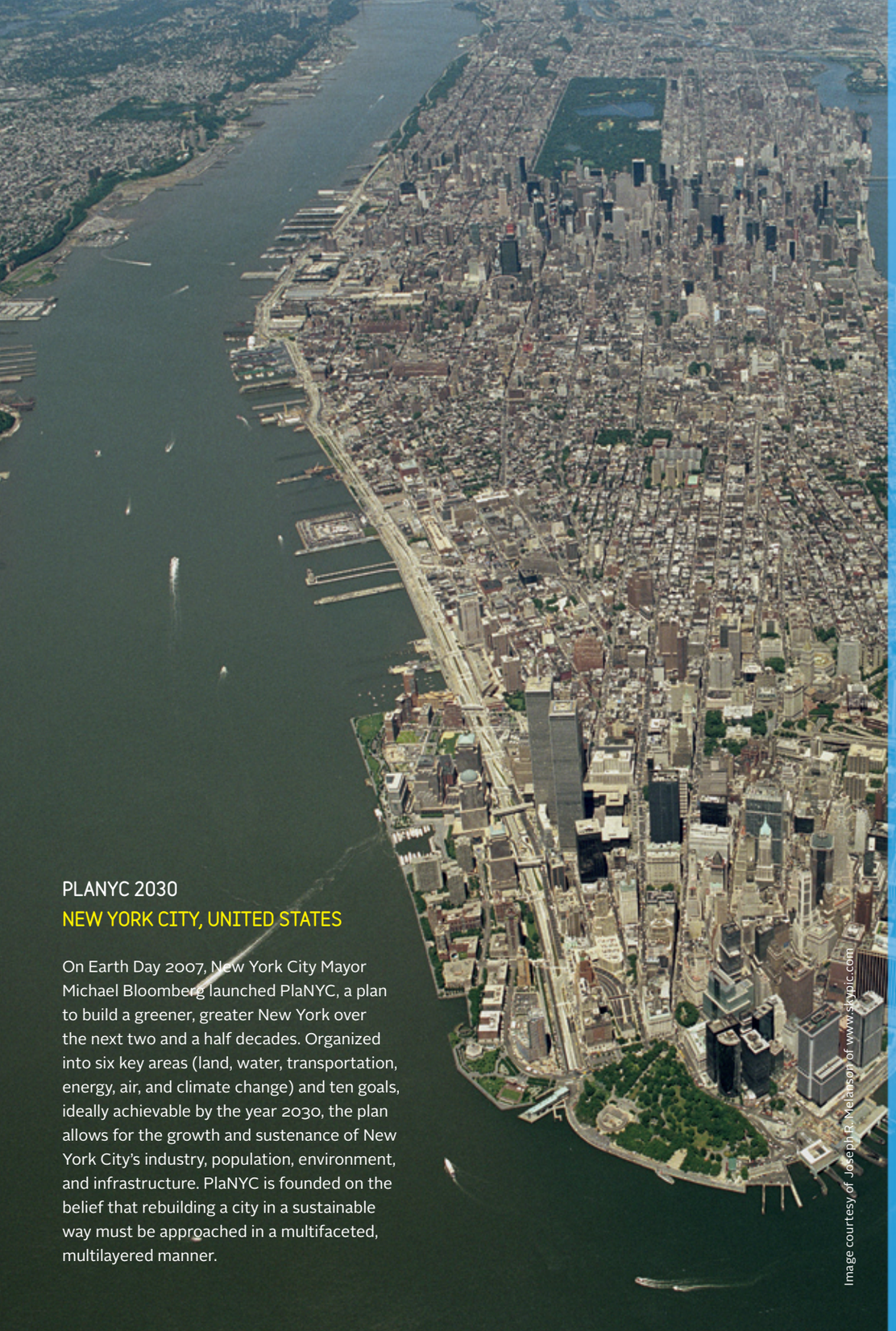


Image courtesy of Joseph R. Melanson of www.skypic.com

PLANYC 2030
NEW YORK CITY, UNITED STATES

On Earth Day 2007, New York City Mayor Michael Bloomberg launched PlaNYC, a plan to build a greener, greater New York over the next two and a half decades. Organized into six key areas (land, water, transportation, energy, air, and climate change) and ten goals, ideally achievable by the year 2030, the plan allows for the growth and sustenance of New York City's industry, population, environment, and infrastructure. PlaNYC is founded on the belief that rebuilding a city in a sustainable way must be approached in a multifaceted, multilayered manner.

"SOME MAY QUIBBLE OVER THE TIMING, BUT IT IS CLEAR THAT WE ARE HEADED TOWARD A GLOBAL DISASTER. BUT THE CONVERSATION ABOUT CHANGES IN GOVERNANCE, ECONOMICS, SOCIAL NORMS, AND DAILY LIFE THAT MUST BE MADE TO AVOID THE WORST OF WHAT LIES AHEAD IS ONLY BEGINNING. IN SHORT, THE LEVEL OF PUBLIC AWARENESS AND POLICY DISCUSSION DOES NOT YET MATCH THE GRAVITY OF THE SITUATION DESCRIBED BY SCIENTISTS. THE PREVAILING ASSUMPTION IS THAT WE CAN ADOPT BETTER TECHNOLOGIES LIKE HYBRID CARS, SOLAR COLLECTORS, AND COMPACT FLUORESCENT LIGHTS AND CHANGE LITTLE ELSE. INDEED, WE WILL NEED ALL THE TECHNOLOGICAL INGENUITY THAT WE CAN MUSTER, BUT THE SCIENCE INDICATES A MUCH MORE PRECARIOUS SITUATION AND THE NEED FOR DEEPER CHANGES THAT WILL REQUIRE SUBSTANTIAL ALTERATIONS IN OUR MANNER OF LIVING."

David W. Orr, Paul Sears Distinguished Professor of Environmental Studies and Politics, Oberlin College

"THE PRINCIPLES OF SUSTAINABILITY AND THE WAY OF THINKING ABOUT CITIES IS REALLY URBAN DESIGN 101. THE CHALLENGE IS REALLY: HOW DO YOU START TO MAKE THOSE THINGS REAL?"

Barbara Southworth, Managing Director, City Think Space

"OUR EFFORTS SHOULD NOT STOP WITH OUR PROFESSIONAL COURSES, OUR DEGREE STUDENTS. WE NEED TO EDUCATE THE POLITICIANS. WE NEED TO RE-EDUCATE THE PROFESSIONALS. WE NEED TO RE-EDUCATE THE PEOPLE WHO ARE IN POSITIONS OF DECISION-MAKING."

Tanner Oc, Professor of Urban Design and Planning; Director, Institute of Urban Planning, School of the Built Environment, University of Nottingham

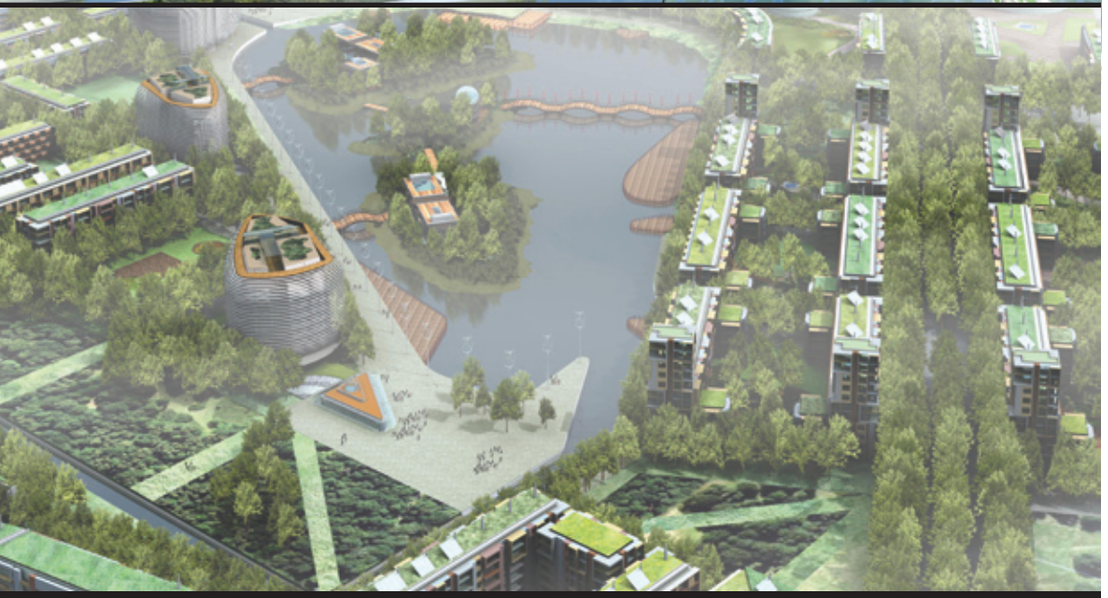
"I SEE THE POSSIBILITY OF COLLABORATION BETWEEN THE URBAN DESIGN STUDIO AND THE URBAN DESIGN HISTORY COURSE."

Rodrigo Perez de Arce, Professor, Architecture, Design and Urban Studies, Pontifical Catholic University of Chile

9

The education for the new urban design professional should be organized around several purposes:

- developing an understanding of the political, philosophical and moral implications of the practice of shaping post-carbon cities;
- cultivating the capacity to envision new urban patterns that embrace ecological complexity, economic sustainability, and social justice, and recognizing that these are sometimes competing objectives;
- developing an understanding of the performance of sites' natural systems over time;



DONGTAN, WANZHUANG
CHINA

Dongtan and Wanzhuang are plans by Arup for new eco-cities in China. The Dongtan Eco-city plan, pictured, calls for three villages that form a small harmonious city on Chongming Island in Shanghai. The plan will restore and enhance adjacent wetland areas to create a 3.5 km-wide "buffer zone" between the city the surrounding mud flats.

Wanzhuang Eco-city, situated along the Hebei Corridor halfway between Beijing and Tianjin, will contain 42 agricultural villages. Wanzhuang Eco-city is meant to integrate the rural landscape and lifestyle with sustainable urban living.

Images courtesy of Arup

9 CONTINUED

- allowing design studios to serve as crucibles for learning, collaboration across disciplines, and interaction with clients and citizens; and

- continuing to develop the traditional skills of conceptualizing and rendering urbanization in all of its dimensions — the relationship between subdivision and land ownership; lots and blocks; building types; the regulatory regime; the infrastructure needed to support settlement; the form, design, activities, and uses of public spaces; the visual and experienced character of places; and the development process.

GREENPIX
SIMONE GIOSTRA & PARTNERS WITH ARUP
BEIJING, CHINA

GreenPix, a zero-energy media wall, applies sustainable and digital-media technology to the curtain wall of Xicui Entertainment Complex in Beijing. Featuring the world's largest color LED display and the first photovoltaic system to be integrated into a glass curtain wall in China, the building functions as a self-sufficient organic system, harvesting solar energy by day and using it to illuminate the screen after dark, mirroring a day's climatic cycle.

Images courtesy of Simone Giostra & Partners with Arup

"A DEGREE OF SKEPTICISM IS PART OF THE STORY, ANOTHER … IS A DEGREE OF IRREVERENCE …."

Witold Rybczynski, Martin & Margy Meyerson Professor of Urbanism, University of Pennsylvania School of Design; Architecture Critic, Slate.com

SAN FRANCISCO URBAN AGRICULTURE PROJECT
SAN FRANCISCO, UNITED STATES

San Francisco is revising its zoning code to allow urban agriculture within the city. Mayor Gavin Newsom, with the city's Planning Department, has proposed a revision of the code to allow gardening and farming throughout the city, as well as to allow the sale of produce grown in gardens in the city. The changes would recognize various scales of urban agriculture, from small-scale gardens to larger-scale farming. The city has also begun collecting organic kitchen waste that it composts to support urban agriculture.

Images courtesy of Recology

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Added to this core of knowledge, future urban designers will need to acquire new skills so that they are able to:

- calculate ecological and carbon footprints at several levels — individual, building, neighborhood, city, and region — and distinguish those designs, urban forms, and everyday practices that minimize the footprints;

- estimate the space and facility requirements at several scales to generate and use energy from alternative sources, to recycle rain and wastewater, to collect and reuse organic waste, and to grow food locally;

LONDON CONGESTION CHARGING
LONDON, UNITED KINGDOM

The London congestion charge is a fee for driving within a zone in central London; the charge aims to reduce traffic congestion and speed travel by encouraging people to choose other forms of transport if possible.

Top right image courtesy of Mendel Giezen; top left image courtesy of Jeni Rodger; bottom image courtesy of photosfing.

10 CONTINUED

- converse knowledgeably with the technical experts on sustainable infrastructure systems, and to integrate these technologies and urban forms;

- understand environmental economics, including markets for alternative energy, the role of incentives and taxes in conservation, financing vehicles and other essentials that impact the ability to change behavior and development processes;

- design circulation systems, especially mass or shared transit, including systems for nonmotorized vehicles and pedestrians of diverse abilities, understanding how the need for mobility is changing with new information and communication technologies;

SITRAC
CAROLINA, PUERTO RICO

In response to inadequate public transportation in Puerto Rico's municipality of Carolina and to the dwindling economic vitality in the historic town center, Carolina implemented the *Sistema Intermodal de Transportación Carolinense* (SITRAC), a bus system that is free for all users. The system's four bus lines connect suburban areas to the town center; the system is complemented by privately owned *público* vans that reach rural residents. SITRAC, serving over 400,000 urban and suburban residents, has been tremendously successful and has dramatically increased Carolinians' confidence in public transit.

Image courtesy of the Municipality of Carolina

10 CONTINUED

- understand the economics and urban densities required to support and integrate alternative-fuel mass transit and vehicles;

- understand the complexity of density (including an understanding of cultural factors in prescribing density, the implication of different densities on infrastructure costs, and learning how to quickly estimate the densities of sketch designs) and design strategies for integrating higher densities into existing cities;

- formulate design guidelines, building codes, and zoning regulations that ensure public health, promote transit access and walkability, reduce the use of and/or generate energy on-site, limit runoff, CO_2 and wastes, encourage use of local materials, and accomplish other sustainable development objectives;

"THE QUESTION THAT I ASK MYSELF EVERY DAY IN MY WORK IS 'HOW CAN I MAKE MY MESSAGE TRANSLATE INTO THE MARKETPLACE?'... ANYONE WHO WORKS IN ARCHITECTURE AND DESIGN NOW HAS TO BE ABLE TO ANSWER THAT QUESTION WHERE SUSTAINABILITY IS CONCERNED."

Elizabeth Kubany, Principal, Elizabeth H. Kubany Public Relations

"AS WE EDUCATE THE NEXT GENERATION OF DESIGNERS, WE WILL TEACH THEM TO SHARE THEIR KNOWLEDGE AND SKILLS ACROSS THEIR RESPECTIVE DISCIPLINES AND WITH THE COMMUNITY WRIT LARGE. WE WILL TEACH THEM TO LISTEN AS WELL AS TALK AND TO SHAPE THE NEW ENVIRONMENTS COLLABORATIVELY. IN SO DOING, THEY WILL LEARN AND GROW AND BE ABLE TO FASHION A POST-CARBON WORLD WITH CREATIVITY, WISDOM AND GRACE."

Eugénie L. Birch, Lawrence C. Nussdorf Professor of Urban Research and Education, Co-Director, Penn Institute for Urban Research, University of Pennsylvania School of Design

10 CONTINUED

- communicate effectively, employing traditional graphic and verbal skills, supplemented with new video, sound, and voice technologies integrated into multimedia presentations, and making projects readily available via the World Wide Web; and

- identify and interact with diverse interests, mediate differences, and undertake negotiation and consensus-building to reach agreement among different constituencies in the face of new global energy and climate challenges.

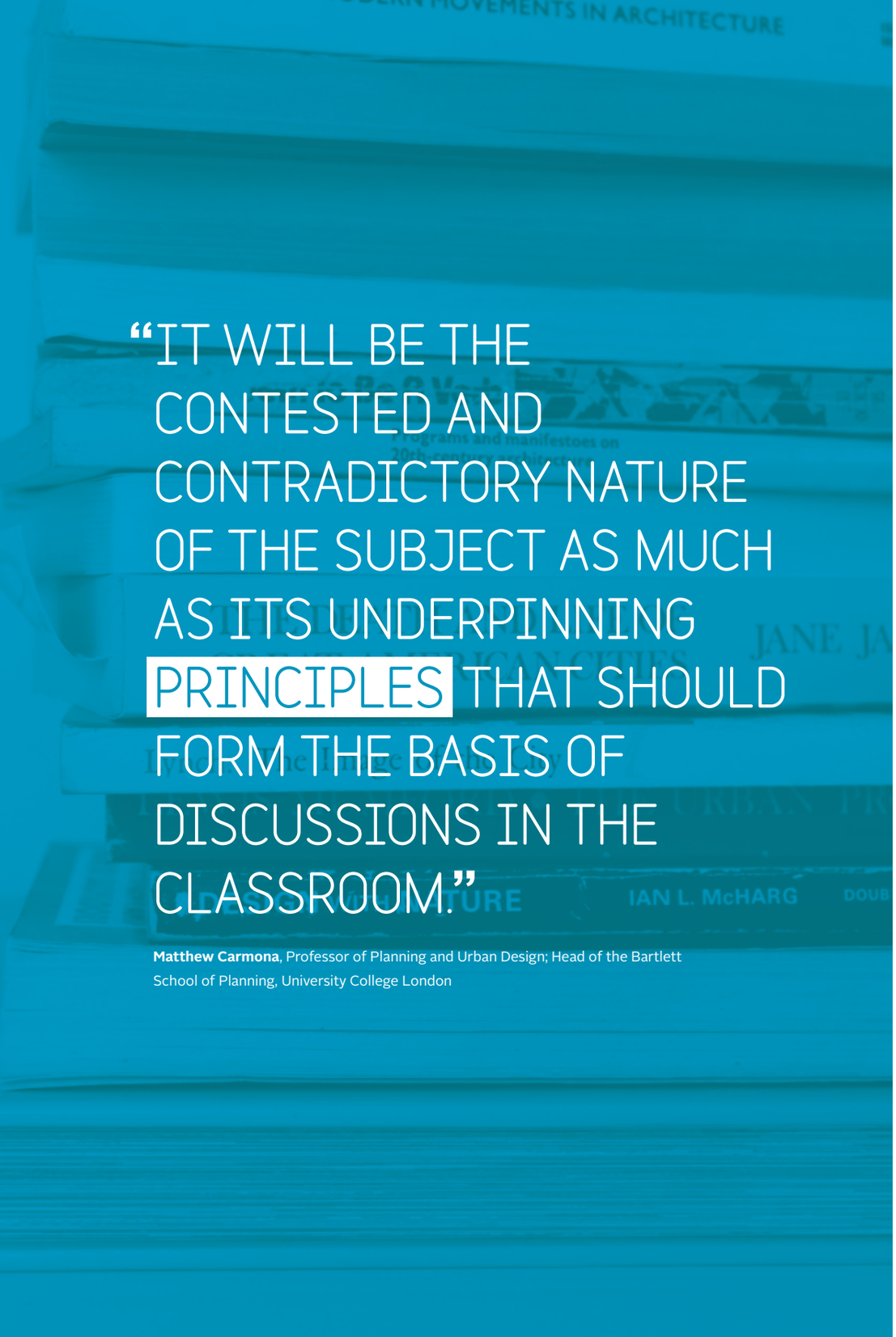
Top and right image courtesy of angelune des lauriers; bottom image courtesy of Gryffindor.

"WHEN WE BEGIN TO RE-IMAGINE INFRASTRUCTURE, WE CAN BEGIN TO RE-IMAGINE THE VERY NATURE OF CITIES AND WHAT IT MEANS TO LIVE AND GROW TOGETHER IN THE URBAN ENVIRONMENT."

Jason Bregman, Director, Environmental Planning and Design,
Michael Singer Studio

HIGH LINE PARK
NEW YORK CITY, UNITED STATES

The High Line is a 1.5-mile linear park that weaves through 22 city blocks on Manhattan's West Side. The project transforms an abandoned elevated railway into a public space designed to stimulate a new urban ecosystem and foster new flora and fauna in the middle of New York City. Designed by James Corner Field Operations with Diller Scofidio + Renfro, the High Line will be built in three stages. The first section opened in 2009.



"IT WILL BE THE CONTESTED AND CONTRADICTORY NATURE OF THE SUBJECT AS MUCH AS ITS UNDERPINNING PRINCIPLES THAT SHOULD FORM THE BASIS OF DISCUSSIONS IN THE CLASSROOM."

Matthew Carmona, Professor of Planning and Urban Design; Head of the Bartlett School of Planning, University College London

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The new urban designer will need to feel comfortable operating under conditions of ambiguity, appreciating the fact that the science and art of integrating sustainability into urban design is an evolving challenge requiring the adaptation and advancement of ideas as they emerge.

“THERE’S NOT A CHANCE THAT THINGS ARE GOING TO STAY THE SAME FOR EVEN A DECADE IN OUR LIVES. SOME FUNDAMENTAL PRINCIPLES STAY THE SAME, THE LOCAL BASIS OF DESIGN STAYS THE SAME, THE DESIRE TO SERVE PEOPLE STAYS THE SAME, BUT THE ISSUES WE’RE FACING AND THE TOOLS WE HAVE TO FACE THEM CHANGE RADICALLY.”

Marilyn Jordan Taylor, Dean and Paley Professor,
University of Pennsylvania School of Design

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Current working professionals also need to quickly acquire an understanding of the essentials of sustainable design. New part-time degree and certificate programs, professional development courses, conferences, workshops, and charrettes should be offered to current practitioners to increase their capacity to employ holistic approaches to sustainable design and to learn the new skills in design curricula suggested here. Once informed about issues of urban sustainability and retrained in the use of new media (print, film, video and the internet), design professionals will have the standing to engage communities, politicians, developers, scientists, and economists, and to lead the public discourse.

Images courtesy of Michael Chia-Liang Lin

"AVOIDED CARBON NEEDS TO BECOME THE NEW CURRENCY. AND IT NEEDS TO INFORM EV-ERYTHING: THE DESIGN OF A KETTLE, A CAVITY WALL, A CITY BLOCK, OR, INDEED, THE MAS-TER PLAN OF AN ENTIRE URBAN REGION."

Bill Dunster, Founder, Bill Dunster architects ZEDfactory, Ltd.

ROBOSCOOTER

This folding electric scooter is designed to be used in shared-use mobility systems in urban areas. Designed by Smart Cities group, is it meant to maximize the advantages of the motor scooter while minimizing its disadvantages.

"IF WE BELIEVE THAT URBANISM IS THE SOLUTION, THEN WE MAY NOT NEED TO WORRY ABOUT DESIGN FIRST; WE MAY NEED TO THINK ABOUT FUNDAMENTAL, BASIC CITY MANAGEMENT. THE RENAISSANCE THAT WE'VE SEEN IN SO MANY AMERICAN CITIES AND, IN FACT, IN MANY CITIES AROUND THE WORLD, I WOULD ARGUE, HAS SOMETHING TO DO WITH THE LESSONS OF JANE JACOBS AND THE PHILOSOPHY THAT WE'VE COME TO UNDERSTAND OVER THE LAST FIFTY YEARS OF WHAT MAKES CITIES BETTER. BUT I WILL TELL YOU THAT THE KEY FACT ABOUT NEW YORK CITY'S RENAISSANCE IS THE FACT THAT THE CRIME RATE HAS GONE DOWN. THE KEY FACT FOR NEW YORK CITY'S LONG-TERM RENAISSANCE IS GOING TO BE THAT OUR EDUCATION SYSTEM IS GOING TO GET BETTER AND IT IS IN THE PROCESS OF GETTING BETTER. THE CHIEF REASON THAT NEW YORK CITY IS ATTRACTING PEOPLE WHEN THEY RETIRE WHEREAS TWENTY YEARS AGO IT WAS EXACTLY THE REVERSE ... IS BECAUSE OF CULTURE AND CITIES AS CULTURAL CENTERS. AND WE MAY WANT TO THINK ABOUT THOSE KINDS OF QUESTIONS AS ENVIRONMENTAL STRATEGIES IF WE ACTUALLY BELIEVE THAT CITIES ARE THE ANSWER TO OUR CARBON PROBLEM."

Rohit Aggarwala, Director, Mayor's Office of Long Term Planning and Sustainability, City of New York

EXHIBITION ROAD
LONDON, UNITED KINGDOM

Exhibition Road, in London, is home to some of the world's leading cultural institutions but the area is currently dominated by heavy traffic. This design proposal will accommodate non-vehicular modes of transportation by transforming the Exhibition Road area into a magnificent, pedestrian-friendly realm by creating a single shared surface, eliminating curbs, removing barriers and traffic signals, and reducing the speed limit to 20 mph.

Images courtesy of the Royal Borough of Kensington and Chelsea

Images courtesy of HollwichKushner Partners

Expanding the Knowledge Base

WORLD EXPO 2010
SHANGHAI, CHINA

World Expo 2010 Shanghai, organized around the theme "Better City, Better Life," included a large area (approximately 37 acres, or 15 hectares) dedicated to the exhibition of projects demonstrating best practices in cities. The Urban Best Practices Area (UBPA) showcased initiatives that promote livable cities, sustainable urbanization, protection of historical heritage, and technological innovation in the built environment. The area included the creation of an urban district that simulates how people could live, work, travel, and recreate sustainably. The UBPA exhibit pictured above — the Alsace Case Pavilion, also known as the "Waterskin House" — uses solar panels and a wall of water to control inside temperature. This exhibit highlights technology in use in the Alsace region of France.

Image courtesy of Kimon Berlin

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There is a need for concrete knowledge on environmental performance, at a level of specificity that reduces the need for speculation. With thousands of experiments across the globe in constructing more sustainable communities, there is ample opportunity for measuring performance over time. These studies need to be compiled and made available to design professionals via the internet.

“WE NEED TO STOP GIVING PRIZES TO BUILDINGS UNTIL WE’VE RUN THEM FOR SEVERAL YEARS AND CAN REALLY EVALUATE HOW THEY DO.”

Robert Socolow, Professor, Mechanical and Aerospace Engineering; Co-Director, The Carbon Mitigation Initiative, Princeton University

NOW HOUSE PROJECT

Now House Project demonstrates that notoriously energy-inefficient postwar homes can be retrofitted to become near-zero-energy homes — buildings that produce almost as much energy as they use and retain most of their original materials. Having completed one net-zero energy retrofit, the project’s initiators plan to next retrofit a community of wartime homes and eventually a million wartime homes across the country. Now House is one of twelve winning teams from across Canada in Canada Mortgage and Housing Corporation’s (CMHC) Equilibrium Sustainable Housing Demonstration Initiative.

Images courtesy of Now House Project

"FOR POLITICIANS TO ACT, THEY NEED TO KNOW THINGS MORE PRECISELY AND, SINCE POLITICIANS ACT ACCORDING TO PUBLIC ATTITUDES AS EXPRESSED THROUGH FOUR-YEAR ELECTION CYCLES, THE PUBLIC NEEDS TO KNOW THINGS MORE PRECISELY TOO."

Clive Doucet, Councillor, Capital Ward, City of Ottawa, Canada

"SO, I THINK THIS MIGHT BE ONE OF THE GREAT UNSOLVED PROBLEMS IN FRONT OF THIS CONFERENCE, WHICH IS HOW DO YOU MOTIVATE THE PEOPLE WHO ARE BENEFITING FROM THE STATUS QUO TO START WORKING AGAINST IT AND ACCEPT A CARBON TAX AND START MAKING MONEY FROM OTHER FORMS OF ENERGY?"

Jonathan Barnett, Professor of Practice in Urban Design, School of Design, University of Pennsylvania School of Design; Senior Consultant, Wallace Roberts and Todd, LLC

SOLARREGION FREIBURG
FREIBURG, GERMANY

SolarRegion Freiburg is a vision to promote the use of solar energy throughout Freiburg, Germany. Adopted in the late 1980s, Freiburg's energy policy promotes energy conservation, the use of new technologies, and the use of renewable energy such as solar; today, Freiburg boasts several hundred solar projects including photovoltaic factories and the SolarRegion Freiburg Forum where citizens discuss local solar policy. In addition to its solar energy initiatives, Freiburg has implemented policies and projects on transportation, waste management, water management, urban planning, and nature conservancy, making Freiburg a shining example of sustainability. Local environmental policies with long-term perspective, deep-seated environmental awareness, and a network of institutions for environmental protection are the keys for the success of this city's environmental plan.

Left image courtesy of Joergens.mi/Wikipedia; top right image courtesy of Claire7373 Andrewglaser; bottom right image courtesy of CrazyD.

“UNDERSTANDING PRECEDES ACTION.”™

Richard Saul Wurman, Chairman, 19.20.21.; Founder, TED

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Every university educating urban designers ought to commit itself to contributing to this base of knowledge. Urban design education programs should also sponsor innovative research and methodological speculation that may not always have immediate application to current projects. This may involve ecological impact modeling that cuts across political and programmatic boundaries or developing speculative scenarios to compel citizens to become active participants in transforming their cities.

“THIS TRANSITION OF OUR SPECIES TO A GLOBAL FORCE, WHERE WE’RE INFLUENCING THE CLIMATE OF THE PLANET, WE’RE THE DOMINANT INFLUENCE ON ECOSYSTEMS NOW ON THE PLANET… AND WE DON’T EVEN KNOW WHAT’S GOING ON YET.”

Andrew Revkin, Reporter, dot Earth, *The New York Times*

The ultimate role of the urban designer is to be someone who is able to describe potential futures for the city in visual, technical, and narrative terms that foster the social involvement, political action, and economic investment to make the post-carbon city a reality.

Acknowledgements

The Penn Resolution resulted from discussions among the more than 300 urban design educators, policy experts, professionals, and students from around the world who attended the *Re-Imagining Cities: Urban Design After the Age of Oil* symposium at the University of Pennsylvania in fall 2008. The drafting committee included: Daniel Abramson, University of Washington; Eugénie L. Birch, University of Pennsylvania; Ellen Dunham-Jones, Georgia Institute of Technology; Gary Hack, University of Pennsylvania; Peter Laurence, Clemson University; David Leatherbarrow, University of Pennsylvania; Rafael E. Pizarro, University of Sydney; Richard M. Sommer, Harvard University; and Roy Strickland, University of Michigan. We are indebted to the Rockefeller Foundation for supporting the creation of this publication.

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Maritza Mercado, curator, Yadiel Rivera-Diaz, Rebecca Esh, Nicholas Frontino, Douglas Meehan, and Jayon You; exhibition and graphic design: Jamie Montgomery, Karl Peters, and Adrienne Yaconne, DIE Creative; PhillyCarShare for lending the vehicle included in the exhibit; Marilyn Taylor, David Leatherbarrow, and William Braham, PennDesign; Grady Clay and Judith McCandless; Julie McWilliams and Tony Sorrentino, University of Pennsylvania; Lisa Chamberlain, Forum for Urban Design; and those who helped originally conceive the symposium: Charlie Cannon, Dolores Hayden, Andrea Kahn, Martin Melosim and Peter Laurence. Thank you also to the Municipal Art Society, which hosted the second mounting of the exhibit in New York City in the fall of 2009; and Jamie Montgomery, Fieldesk, for design of the exhibit for the MAS installation.

About the Symposium

The *Re-Imagining Cities: Urban Design After the Age of Oil* symposium and exhibit were made possible through the support of the Rockefeller Foundation. The University of Pennsylvania School of Design and Penn Institute for Urban Research hosted the symposium.

The School of Design of the University of Pennsylvania is dedicated to improving the quality of life through the design and preservation of artworks, buildings, landscapes, cities, and regions. PennDesign promotes excellence in design across a rich diversity of programs – Architecture, City Planning, Landscape Architecture, Fine Arts, Historic Preservation, Digital Media Design, and Visual Studies. **www.design.upenn.edu**

The Penn Institute for Urban Research (Penn IUR) is a university-wide body that addresses the issues of twenty-first-century cities locally and globally. Penn IUR believes that place matters in understanding political, social, and economic phenomena and that spatially based approaches are essential to identifying contemporary urban challenges, strategies, and solutions and their application to public policy. Penn IUR offers several programs to support urban-focused, cross-disciplinary instruction, research, and civic engagement. **www.upenn.edu/penniur**

The Rockefeller Foundation was established in 1913 by John D. Rockefeller Sr. The Foundation attempts to harness the creative forces of globalization by supporting breakthrough solutions to twenty-first-century challenges. This helps ensure that the tools and technologies that have significantly improved the human condition in many locations over the past half-century are accessible to more people, more fully, in more

places—and that poor and vulnerable people are equipped to seize them. **www.rockfound.org**

The *Re-Imagining Cities: Urban Design After the Age of Oil* symposium and exhibition was dedicated to Gary Hack, Dean Emeritus of PennDesign and current professor of urban design. During his twelve years as Dean, Gary Hack led PennDesign to national recognition as one of the top design schools in the country – shaping thousands of students as leaders in the fields of architecture, city planning, landscape architecture, historic preservation, and the fine arts.

In addition to being a gifted teacher and leader, Professor Hack has made immeasurable contributions to the practice and study of large-scale physical planning and urban design. He is co-author of the third edition of *Site Planning* and of *Lessons from Local Experiences*, as well as numerous articles and chapters on cities' spatial environments. He was a member of the team that won the competition and prepared the design guidelines for redeveloping the World Trade Center site. He also co-directed an international comparative study of urbanization patterns, published as *Global City Regions: A Comparative Perspective.*

Prior to coming to Penn, he was a professor of urban design at MIT and a partner in the professional firm of Carr Lynch Hack and Sandell in Cambridge. Earlier in his career Professor Hack was head of planning for Gruen Associates in New York and directed the Canadian government's housing and urban development research and demonstration programs, initiating several large neighborhood demonstration projects and the redevelopment of urban waterfronts in a number of Canadian cities. He has also served as an urban design consultant for projects in Japan, Taiwan, China, and Saudi Arabia.

Professor Hack has prepared plans for over thirty cities in the United States and abroad, including the redevelopment plan for the Prudential Center in Boston, the West Side Waterfront plan in New York City, and the new Metropolitan Plan for Bangkok, Thailand. He has also worked with smaller communities on urban design issues by preparing downtown development guidelines for the center of Portland, Maine; design review manuals for Hendersonville and Germantown, Tennessee; and guidelines for the development of the entrance corridors and downtown of Charlottesville, Virginia. Professor Hack has served on the Executive Committee of the Association of Collegiate Schools of Planning and the Planning Accreditation Board. He is a former chair of the Philadelphia City Planning Commission.

This symposium, exhibition, and manifesto on urban design education would not have been possible without Professor Hack's leadership and imagination.

Symposium Attendees

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Rohit Aggarwala, NYC Mayor's Office of Long Term Planning and Sustainability
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Stacy Bare, University of Pennsylvania
Jonathan Barnett, University of Pennsylvania
Timothy Beatley, University of Virginia
Nate Berg, Planetizen
Devon Bertram, YRG sustainability
Lisa Beyer, University of Pennsylvania
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Eugénie Birch, Penn Institute for Urban Research
Omar Blaik, U3 Ventures
Andrew Blum, *Wired*
Catherine Bonier, University of Pennsylvania
Cassidy Boulan, University of Pennsylvania
Nick Bovino, Greater Camden Unity Coalition
Caitlin Bowler, ICON architecture, inc.
William Braham, University of Pennsylvania
Roberta Brandes, Gratz Gratz Industries
Arionna Brasche, Goddard College
Jason Bregman, Michael Singer Studio
James Scott Brew, Rocky Mountain Institute
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Anna Brown, The Rockefeller Foundation
Hillary Brown, New Civic Works
Lance Brown, The City College of New York/ CUNY
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Stephen Goldsmith, Center for the Living City
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All titles are current as of the 2008 symposium (with the exception of PennDesign, which are current as of publication).

References and Further Information

Sources of Quotations

Many of the quotations found in this publication came from manuscripts solicited by Penn IUR following the 2008 *Re-Imagining Cities: Urban Design After the Age of Oil* symposium. These papers, many of which can be downloaded from the Penn IUR website (penniur.upenn.edu), include (asterisks indicate papers quoted in this book):

Diana Balmori, *Greening the Fifth Façade*
William Braham, *Dimensions, Scales, and Measures of Environmental Design*
*Jason Bregman, *Re-Imagining Infrastructure*
*Matthew Carmona, *Sustainable Urban Design: Questions for Educators*
Dickson Despommier, *The Vertical Farm: Growing Eco-Cities*
*Clive Doucet, *New Witches or New Attitudes*
*Bill Dunster, *New Greens: Why We Need to Conserve Our Renewable Resources .. And How We Can*
Lorraine Gauthier and Steve Harjula, *New Ideas Need Old Buildings*
Martin Haas, *Planning for the Return of Public Space*
Karis Hiebert, *Learning by Doing: Southeast False Creek and Neighborhood Sustainability*
*Lance Hosey, *Trashing Eden*
Barry M. Katz, *The Behavioral Turn*
Peter Laurence, *Urban Design and the New Environmentalists*
Maritza E. Mercado, *Imagining the Post-Carbon City*

*David W. Orr, *Climate Destabilization and the Future of the City*
*William Rees, *Cities After Oil*
*Robert Socolow, *Carbon Innumeracy and Global Equity*
Alex Steffen, *My Other Car Is a City: How America's Obsession With Green Cars Misses the Point*
James van Hemert, *The Sustainable Development Code: Regulating Sustainability for a Post-Carbon World*
Kongjian Yu, *The Negative Approach: Ecological Infrastructure and the Re-Imagining of Cities*

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In addition to the authors and speakers noted above, several quotations were selected from other published sources. These include:

Balmori, Diana. *A Landscape Manifesto*. New Haven: Yale University Press, 2010.

Fuller, R. Buckminster. *Operating Manual for Spaceship Earth*. Carbondale, IL: Southern Illinois University Press.
Jacobs, Jane. "Downtown Is for People." *Fortune*. April 1958.
McDonough, William and Michael Braungart. *Cradle to cradle: remaking the way we make things.* New York: North Point Press, 2002.
Ian McHarg in Wallace, David, ed. *Metropolitan Open Space and Natural Process*. Philadelphia: University of Pennsylvania, 1970.

Project leadership, dates, and further information

100K House: interface studio architects llc and Postgreen Homes; Inhabited: 2009; www.100khouse.com

Bedzed: ZEDfactory Ltd, architects; Completed 2002; www.zedfactory.com

PlaNYC 2030: Plan by Mayor's Office of Long-Term Planning and Sustainability; Plan completed 2007; www.nyc.gov/html/planyc2030/html/home/home.shtml

Cheongyecheon: Seoul Metropolitan Goverment; Completed: 2005; english.sisul.or.kr/grobal/cheonggye/eng/WebContent/index.html

Chicago Central Area Decarbonization Plan: Adrian Smith + Gordon Gill Architecture; Plan completed 2010; www.smithgill.com/

City of Freiburg: City of Freiburg Solar Region; Implemented 1992; www.solarregion.freiburg.de/solarregion/grusswort.php

Copenhagen Biking: City of Copenhagen; www.kk.dk/sitecore/content/Subsites/CityOfCopenhagen/SubsiteFrontpage/LivingInCopenhagen/CityAndTraffic/CityOfCyclists/CopenhagenCyclePolicy.aspx

Dongtan, Wanzhuang: Arup; Plans completed 2006 and 2008; www.arup.com

Exhibition Road: Royal Borough of Kensington and Chelsea; Expected implementation 2012; www.rbkc.gov.uk/subsites/exhibitionroad.aspx

Green City/Clean Waters: City of Philadelphia; Plan completed 2009; www.phillywatersheds.org/

Greenpix: Simone Giostra Architect & Arup; Completed 2008; www.greenpix.org/

Havana Popular Gardens: Poder Popular; Founded 1991.
A program promoting popular gardens – small parcels of state-owned land that are cultivated by individuals or community groups – began in 1991. When the Soviet Bloc collapsed in 1989, Cuba lost imports of food and agricultural inputs; the tightening of the US economic embargo further tightened supply of petroleum for transporting and refrigerating agricultural products. The food shortages that ensued spurred Havana residents to plant gardens wherever they could: on porches, balconies, backyards. The city and state governments supported these efforts, making public land available free of charge for agricultural use by residents. Begun in Havana, the program has since spread to other cities.

High Line Park: Field Operations; Opened 2009; www.thehighline.org/

Lilypad Floating Ecopolis: Vincent Callebaut Architectures; www.vincent.callebaut.org

London Congestion Charging: Mayor of London; Implemented 2003. www.london.gov.uk/who-runs-london/mayor

Medellín Metrocable: Metro de Medellín; Completed 2006; www.metrodemedellin.org.co/index.php?option=com_content&view=article&id=61&Itemid=165&lang=en
The City of Medellín, Columbia was faced with the challenge of providing access to underdeveloped towns located in the steep terrain surrounding the city. Rather than build more roads or lay rail, Metro de Medellín built an innovative system of cable cars connected to a fixed cable, which connect outlying areas without disrupting the existing dense urban development. Metro-Cable stations are strategically located in high-density areas and at the intersections of main thoroughfares.

MEtreePOLIS: HollwichKushner LLC (HWKN); www.cargocollective.com/hwkn#961320/METREEPOLIS
MEtreePOLIS is a vision for Atlanta 100 years from now. Projecting real developments in the field of genetic manipulation into the future, HWKN proposes that technological advances will connect photosynthetic molecules with solid-state electronic devices, effectively turning modified plants into energy producers called "power plants." In this scheme, buildings are converted from resource consumers to power producers. Atlanta is envisioned as a product of enhanced nature—stratified like a forest, with a canopy at the top collecting water and energy, and a city floor of bio-renewable moss.

Now House: Work Worth Doing; First retrofit completed: 2008; www.nowhouseproject.com/

Roboscooter: MIT Media Lab and: Smart Cities Group, www.media.mit.edu/

San Francisco Urban Agriculture Project: Office of the Mayor; sfmayor.org/ftp/archive/209.126.225.7/index.html

Schiff Residences: Murphy/Jahn Architects; Completed 2007; www.murphyjahn.com

Sitrac: Municipality of Carolina; Implemented 2008; www.gmacpr.com/

Stabilization Wedges: "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," S. Pacala and R. Socolow, *Science*, Vol. 305, Issue 5686, pp. 968- 972, August 13, 2004.

World Expo 2010: Shanghai, China; 2010; en.expo2010.cn/