New York City's Sustainable Future: An Economist's Perspective

Matthew E. Kahn
UCLA and NBER
Institute of the Environment
Departments of Economics and Public Policy
Mek1966.googlepages.com

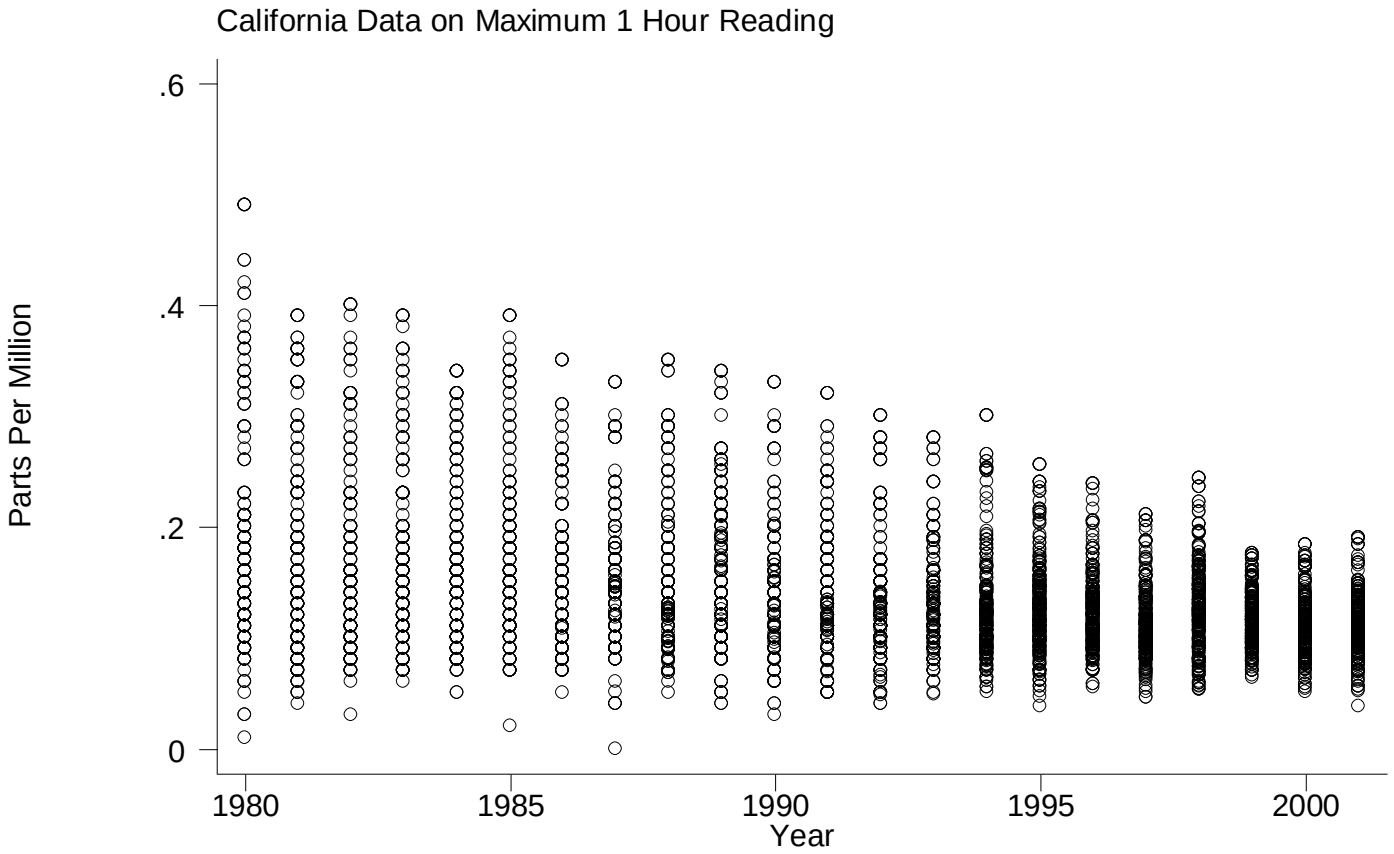
Introduction

- Son of two NYU Graduates!
- “Emeritus” Columbia faculty member
- Manhattan resident from 1968 to 1973 and 1993 to 2000.
- Environmental and urban economics
- Married to an economist

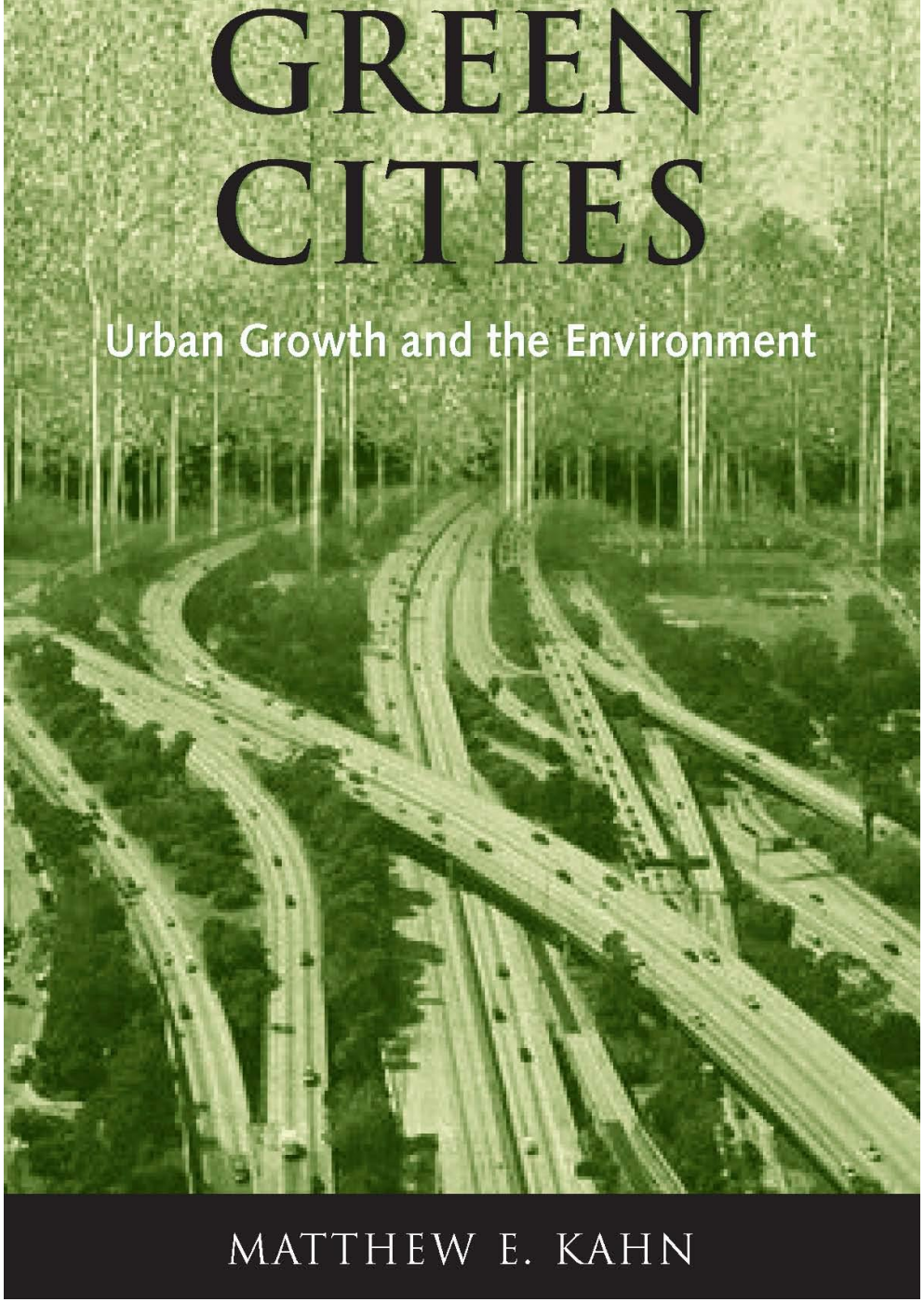
My Favorite "Big Think" Research Question

- Is capitalist free market growth, a "friend" or "foe" of urban environmental quality?
- **Example #1:** Is Los Angeles or NYC a "Green City"? Will they be "greener" in 2050?
- **Example #2:** Are Beijing and Shanghai "Green Cities"? Will they be "greener" in 2050?
- The "Amazing Race" between quantity and quality of economic activity in capitalist cities

California Air Pollution Progress



The Distribution of Ambient Ozone By Monitoring Station


GREEN
CITIES
Urban Growth and the Environment
MATTHEW E. KAHN

Why Should You Care about "Green Cities"?

- Public health and direct health benefits
- Cities are capitalism's growth engine
- In 2011, what is the USA's "edge"?
- Creativity and innovation
- Attracting and retaining the "creative class" is the key to sustainable urban economic growth
- A city's "greenness" is a key determinant of quality of life and livability

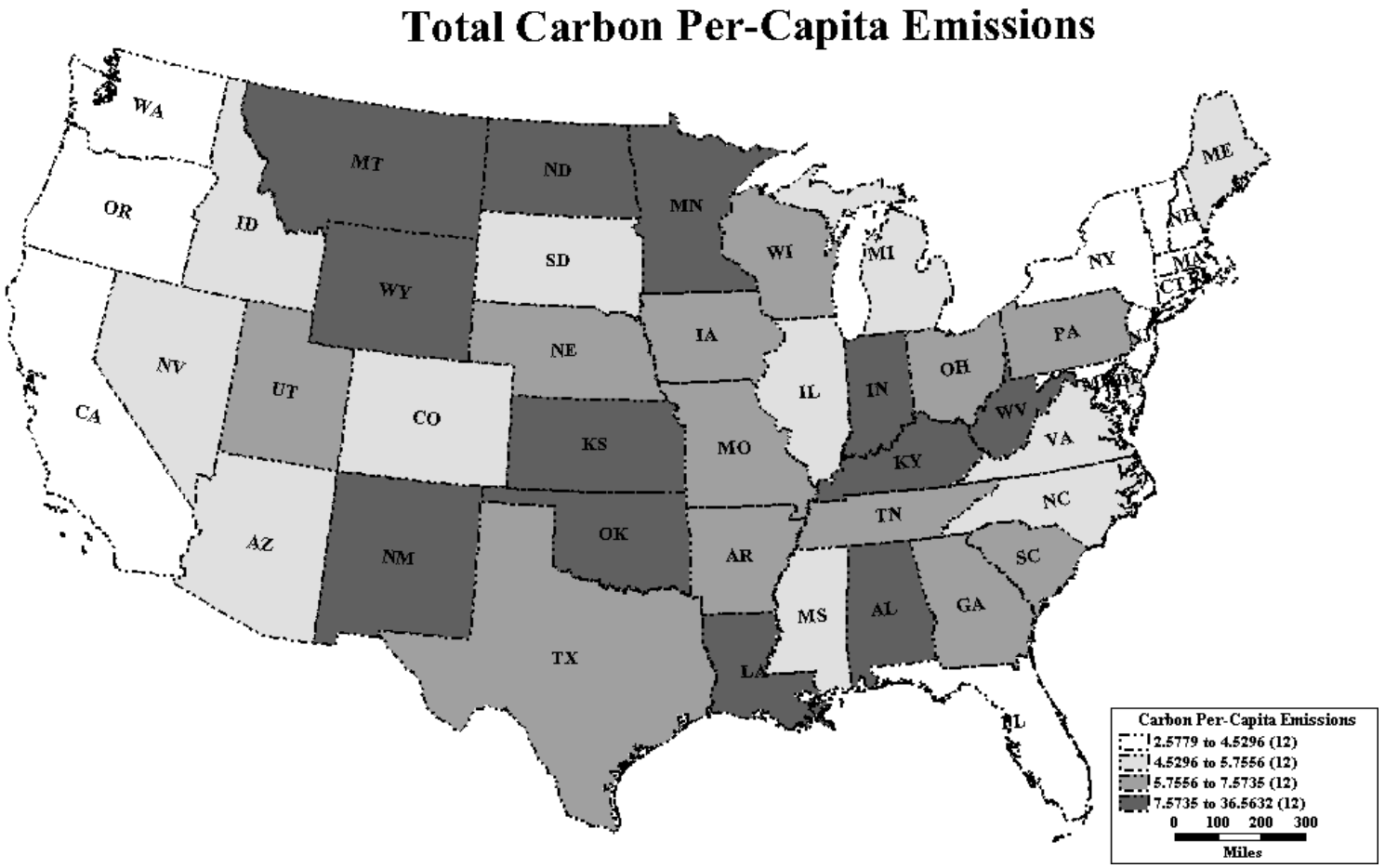
Pivot to 2011

- My 2006 Green Cities book had a single chapter devoted to climate change.
- It focused on “local” pollution challenges
- My recent academic research:
- climate change mitigation
- climate change adaptation

The Political Economy of Voting on Carbon Mitigation Policies

- Greenhouse gas (GHG) emissions are a world public bad
- The U.S and China produce roughly 50% of the emissions
- I am pessimistic that the Republican Congress will pass carbon mitigation legislation

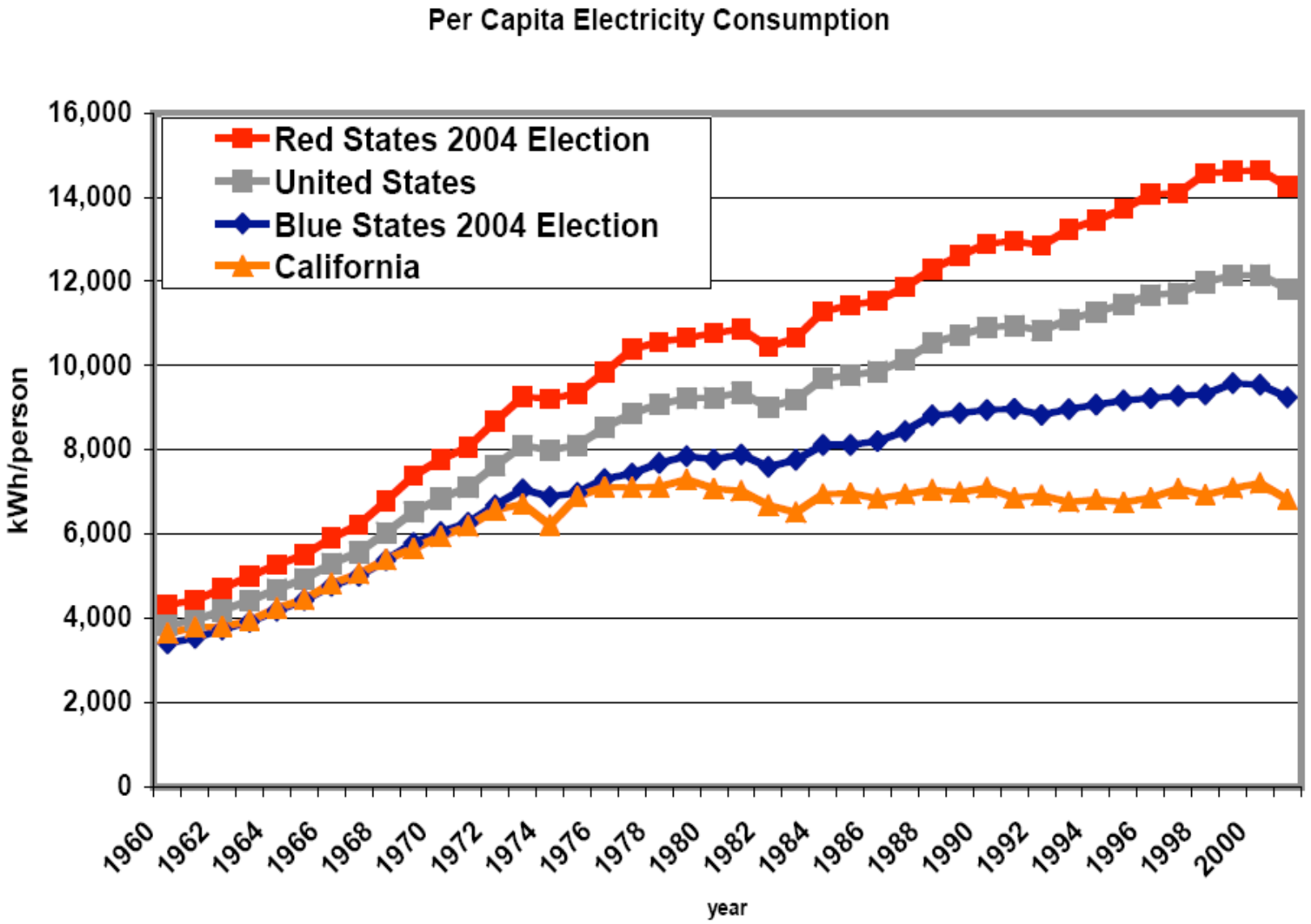
Carbon Emissions Across the USA



Cragg and Kahn (2011)

- Analysis of Voting on the 2009 American Clean Energy and Security Bill (Waxman/Markey)

- Liberal, wealthy, low carbon areas have political representatives who vote in favor of mitigating carbon



http://www.energy.ca.gov/2006publications/CEC-999-2006-011/CEC-999-2006-011-TALK.PDF

California as a “Green Guinea Pig”

- California’s AB32 regulation ➔ reduce the state’s greenhouse gas emissions by 80% below 1990s level by 2050
- Renewable Portfolio Standard
- Cap & Trade for electric utilities
- Higher MPG for vehicles
- Energy efficiency standards for buildings
- Learning and Experimentation yields new ideas = public goods

New York City as a "Low Carbon" City

- Glaeser and Kahn (2010)
- For 66 major United States cities, we answer the question; "where would Al Gore want a your household to live?"
- Household Carbon Dioxide Emissions = Transportation + Electricity + Heating

What's Going Right in NYC?

- Most people live in apartments
- Most people live in small housing units
- Most people use public transit
- Employment remaining downtown
- Suburbanized employment ➔ more likely to live in the suburbs in a bigger home, consume more electricity and heat and drive more

Climatopolis: How Our Cities will Thrive in the Hotter World

- Given world population growth (which is slowing due to urbanization)
- Given rising per-capita income (due to urbanization)
- Given that we have no incentive to economize on greenhouse gas emissions, GHG emissions will rise;
- ➔ Over the next 70 years we will face climate change
- Doom for our cities?

Climatopolis' Core Ideas in One Slide!

- An optimistic book about the evolutionary ability of urbanites to be resilient and to adapt in the face of change
- Unlike other creatures, we can anticipate the future and make plans in anticipation of the challenges we will face
- We are not passive victims of Mother Nature's blows.
- Capitalist free markets facilitates adaptation

Two Salient Examples

- Moscow Summer Heat Wave of 2010
- Learning about a moving target
- Hurricane Katrina and 2005
- Thomas Mayne of UCLA and the floatable home
- Anticipated future suffering = a market for entrepreneurs! (the next Facebook)
- Innovation and Migration as adaptation strategies

A Useful Comparison?

- Let's Contrast the "War on Terror" and "adapting to climate change"
- In the case of the war on terror, we face a strategic opponent who observes how we adapt and searches for a new weakness
- Harder to adapt to a strategic terrorist threat relative to climate change
- How we invest in staying "nimble"?

The Future of NYC?

- Cities compete
- Despite 9/11/2001, NYC had a great 2000s with Wall Street's Boom, declining crime, and a "greening" of the City
- Will the skilled continue to want to live and work here?
- Unique Quality of life as the anchor
- Will climate change "rock the boat"?

PlaNYC 2030

- The Bloomberg administration has commissioned a set of experts to identify what the most likely future climate scenarios are.
- The New York City Climate Change Adaptation Task Force is tasked with studying infrastructure planning in anticipation of climate change. SMART!
- The Bloomberg administration has called for new flood-zone maps in its PlaNYC 2030 project. How will these maps affect investment?

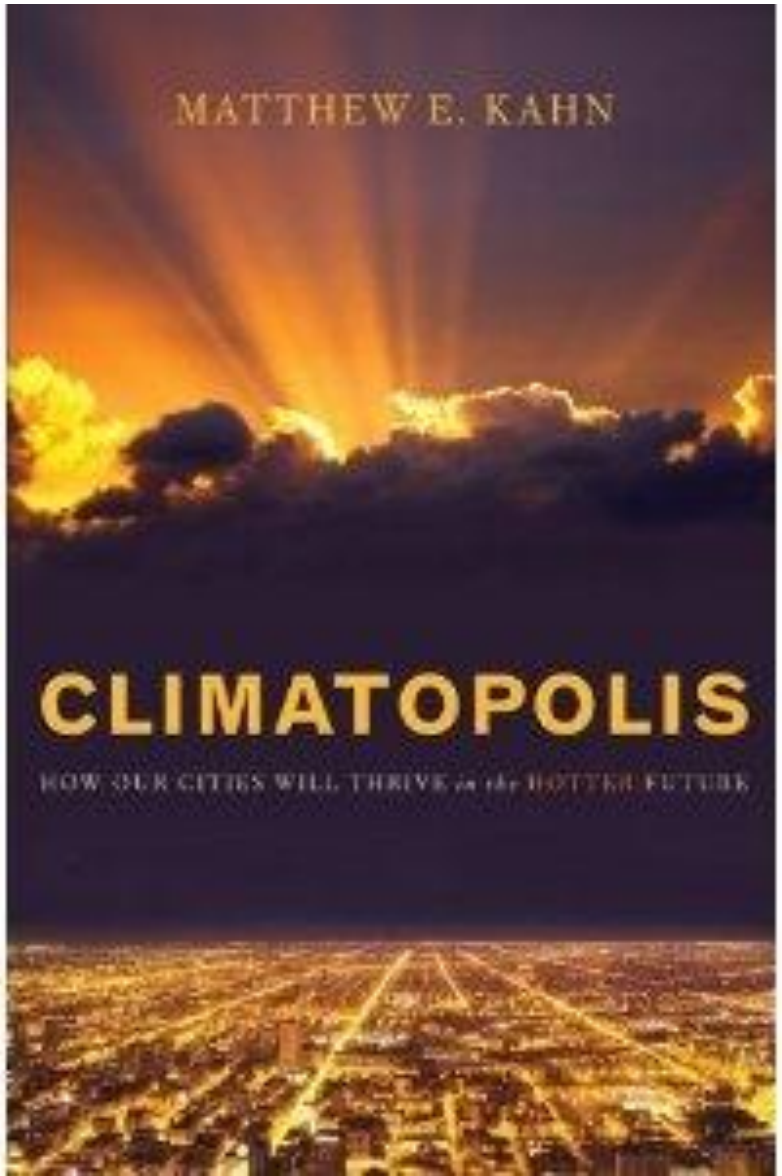
Local Government's Role in Helping the City to Adapt

- Urban planning
- Information provision
- Insurance pricing and "price gouging"
- Worst case scenario planning
- Backup plans
- High frequency data
- Protecting the poor (my work on deaths from natural disasters, Kahn 2005)

Conclusion

- My optimism
- Does optimism lull?
- I would love to see us reduce our carbon emissions now.
- Power of experimentation and learning and California's AB32 efforts.

Basic Books September 2010



Livability in a Changing Climate

Irene Boland Nielson
EPA Region 2
February 3, 2011

Taking Action on Climate Change

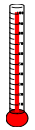
"[C]limate change will affect other parts of **our core mission**... and we must include those considerations in **our future plans**."

Lisa P. Jackson, Administrator,
U.S. EPA

Climate Change is Affecting Human Health and the Environment

Infrastructure
Water
Transportation
Energy Supply & Use

Climate Changes



Temperature

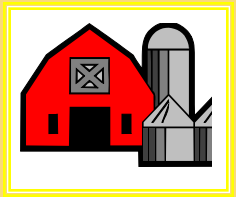
Precipitation

Sea Level Rise

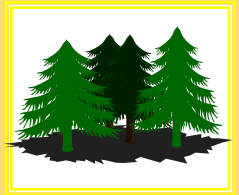
Cultural Resources

Economic Disruption

Health
Weather-related Mortality
Infectious Diseases
Air Quality -Respiratory Illnesses



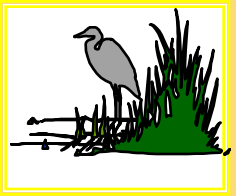
Agriculture
Crop yields
Irrigation demands



Forest
Change in forest composition
Shift geographic range of forests
Forest Health and Productivity

Water Resources
Changes in water supply
Water quality
Increased competition for water

Coastal Areas
Erosion of beaches
Inundate coastal lands
Costs to defend coastal communities



Wildlife and Ecosystems
Shift in ecological zones
Loss of habitat and species
Damage to Coral Reefs

A Smart Policy Portfolio

- Must consist of a mix of strategies to ***mitigate*** GHG emissions and to ***adapt*** to a changing climate

- **Mitigation:** essential to slow the rate of change

- **Adaptation**: essential because climate will continue to change
  - regardless of actions taken to mitigate
  - due to **natural variability** in climate
  - as well as **human-induced** climate change

Executive Order 13514 (2009)

Sec. 16. [A]gencies **shall participate actively** in the interagency Climate Change Task Force . . . and **shall develop approaches** . . . compatible with [its] strategy.

Interagency Climate Change Adaptation Task Force

- Report to the President released Oct. 14, 2010
- Discusses implications of climate change for Agencies' missions & recommends actions
- TF will continue to work toward a 'national strategy', and monitor progress implementing recommendations
  - Agencies are being asked to develop adaptation strategies
  - Partnership Committee to be formed with Stakeholders to develop concepts for a 'national strategy'
- New and Ongoing Workgroups:
  - Water
  - Health
  - Insurance
  - Fish, Wildlife, and Plants
  - Oceans and Coastal
- 2nd Progress Report to the President due Oct. 2011

Partnership for Sustainable Communities

HUD-DOT-EPA

6 Partnership Principles

1. Provide more **transportation choices**
2. Promote equitable, affordable **housing choices**
3. Improve **economic competitiveness** of neighborhoods by giving people reliable access to employment centers, educational opportunities, and other basic services.
4. Target Federal funding toward **existing communities** – through transit-oriented development and place-based policies
5. **Align federal policies** and funding to remove barriers to collaboration, leverage funding and increase the effectiveness of existing programs.
6. Enhance the **unique characteristics** of all communities, whether rural, suburban or urban.

Climate Ready Water Utilities

- **CREAT – Climate Resilience Evaluation and Awareness Tool**
  - Builds knowledge and guides assessment for planning
  - Free software available online

- **Tabletop Exercise Tool for Emergency Preparedness, Response, and Climate Resiliency (TTX Tool)**
  - Customizable exercises for regional needs or concerns
  - Climate scenarios (fire, drought, flood, freeze/thaw, and sea level rise) for long-term planning measures

- **CRWU Toolbox**
  - searchable toolbox with more than 400 resources
  - utility activities, workshops, publications, funding, tools

  - http://www.epa.gov/safewater/watersecurity/climate/

Climate Ready Estuaries

part of the National Estuary Program

- Growing demand for coastal adaptation
  - Limited alternatives for coasts: armor, elevate, retreat, or “wait and see”
- Begins with a fundamental premise/reality that every estuary is unique – ecologically, politically, and socially
- Supports coastal communities to develop and implement adaptation plans
  - Partnered with 15 NEPs in 2008-2010 on 24 projects

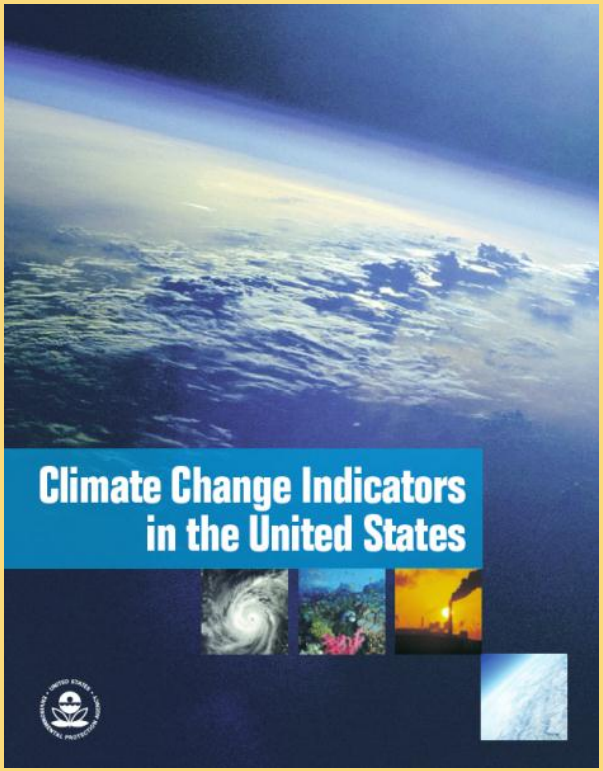
CLIMATE READY ESTUARIES EPA

Climate Showcase Communities

- Models of sustainable communities that generate cost-effective greenhouse emission reductions
- Improve environmental, economic, public health and social conditions

http://www.epa.gov/statelocalclimate/local/showcase/

Climate Change Indicators

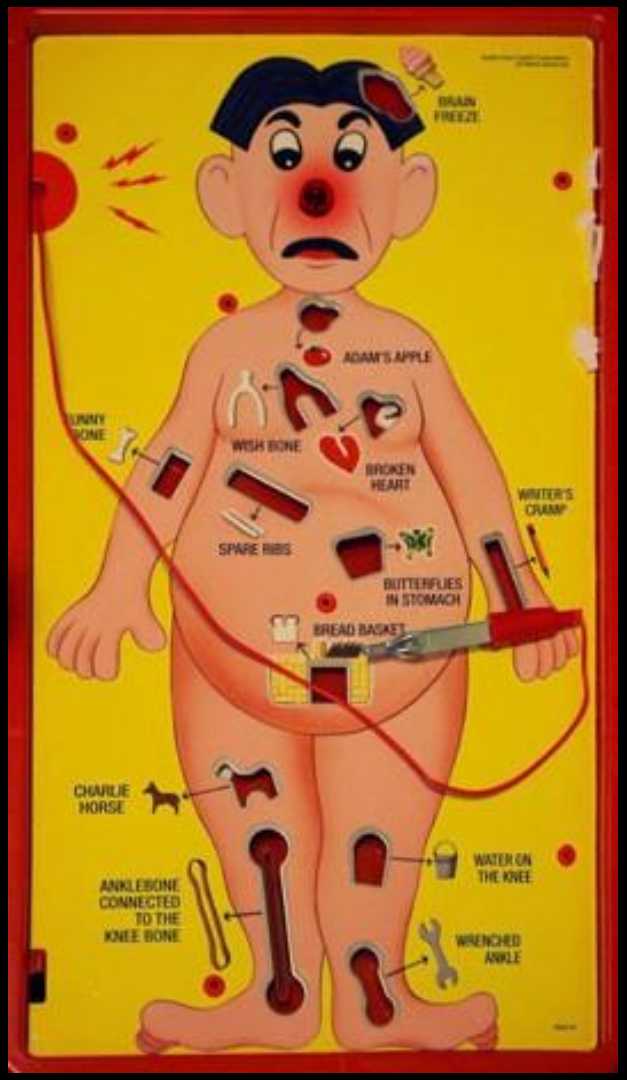


- Indicators represent the state of environmental conditions in an area over time
- Understanding climate change is essential to adaptation

http://www.epa.gov/climatechange/indicators.html

LIVABILITY_green cities

Louise Harpman | NYU | Gallatin School of Individualized Study | Wagner School of Public Service


BRAIN FREEZE
ADAM'S APPLE
FUNNY BONE
WISH BONE
BROKEN HEART
WRITER'S CRAMP
SPARE RIBS
BUTTERFLIES IN STOMACH
BREAD BASKET
CHARLIE HORSE
WATER ON THE KNEE
ANKLEBONE CONNECTED TO THE KNEE BONE
WRENCHED ANKLE


THE ENDLESS CITY
The Urban Age Project by the London School of Economics and Deutsche Bank's Alfred Herrhausen Society
121
10,045
14%
35.6%
19m
47.5x
24.1%
$1.3m
10%
lived in cities in 1900
50%
is living in cities in 2007
75%
will be living in cities in 2050
4%
22.7%
65%
56%
16m²
2.5x
55%
25x
PHAIDON
33%
35%
91%

TORONTO

Toronto Central Waterfront
www.towaterfront.ca/explore_projects2/central_waterfront/planning_the_community/central_waterfront_design_competition

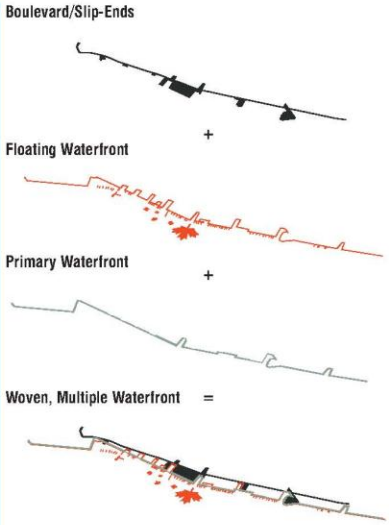
Statements

1.
There exists a clear image of the Canadian lakefront; however, what is Toronto's identity and relation to the water? How can we promote the authentic Canadian lakefront within the metropolis?

2.
- Connectivity along the lakefront
- Connectivity to the hinterland
- Representation of identitites and cultures on the waterfront
- Stitching & weaving the waterfront and its tracks

3. Sustatinability
- Biotopes
- Stormwater
- Durable timber detailing
- Moonlight lighting
- Clean water
-Aquatic habitat
- Accessibility
- Public transit and bikes
-"Green Foot"
- Native Trees, robust landscape

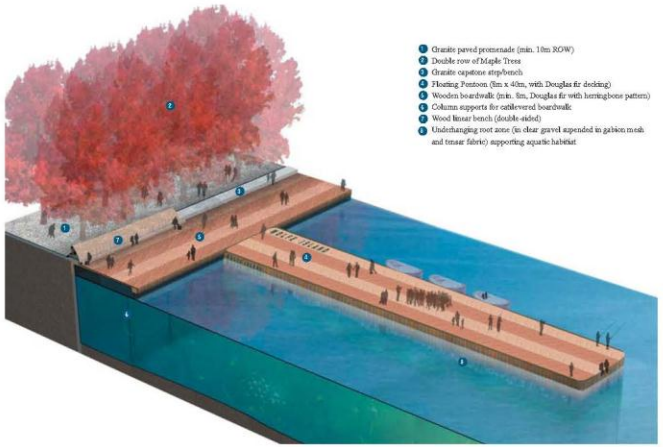
DESIGN TEAM:
WEST8
DUTOIT ALLSOPP HILLIER
SCHOLLEN & COMPANY
DIAMOND + SCHMITT ARCHITECTS
ARUP
HALSALL ASSOCIATES
DAVID DENNIS DESIGN



1 Primary Waterfront

WATER'S EDGE
PUBLIC PROMENADE

18m
MINIMUM PUBLIC ROW



A generous dimension for the Primary Waterfront is essential to establish the appropriate metropolitan scale of the lakefront. An 18m ROW is the new minimum standard width for the water's edge promenade. This dimension is necessary to accomodate the ideal section, based upon: the minimum spacing of trees to allow for a dense, green promenade with adequate room for trees to establish a solid root zone; the allowance for a mix of different types of movement including walking, jogging and in-line skating; and the appropriate diversity of spatial quality that allows for shade and protection within the tree canopy and the openess and exposure along the lake edge.
The promenade is public and continuous, extending the length of the central waterfront. It must adapt to a range of existing contexts and conditions; therefore, its section is changing and flexible. However, a consistency and coherence remains through the material treatment along its entire length. The promenade is formed by two principal parts: a granite promenade along the existing quay wall, plus a slightly lowered cantilevered wooden boardwalk that extends over the water. These two parts work as a pair, to ensure that a generous dimension is maintained.

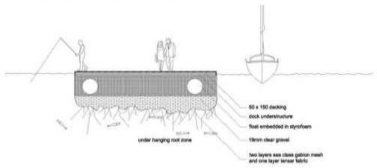
THE "GREEN FOOT" VIEWED FROM THE BAY

VIEW ACROSS THE WOODEN BOARDWALK TO THE FLOATING WATERFRONT

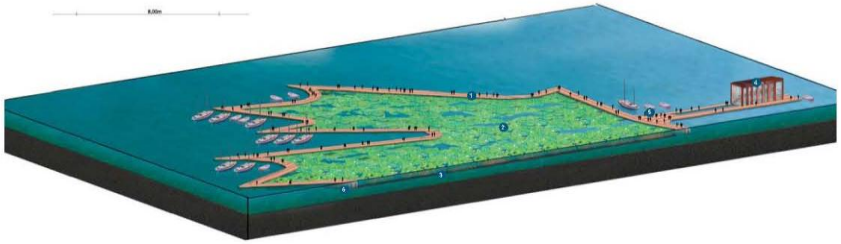
VIEW ACROSS THE WOODEN BOARDWALK TO THE FLOATING WATERFRONT

2 Floating Waterfront

THE CITY'S NEW FLOATING SHORELINE

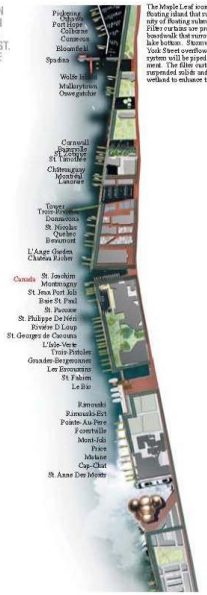


1. Maple Leaf Loop Boardwalk (CKkm Loop walkway, wooden deck)
2. Water-lily floating wetland
3. Filter curtain
4. "The Stem" Restaurant/Cafe with inner water garden and lookout
5. Water taxi stop
6. Ballast tank float



MORNING JOG AND PADDLE AROUND THE FLOATING LEAF ISLAND

EACH FLOATING PONTOON IS NAMED AFTER A TOWN OR CITY FOLLOWING THE LAKESHORE ALONG THE ST. LAWRENCE RIVER TO THE ATLANTIC



The Maple Leaf Icon is designed as a large floating island that supports a robust community of floating submergent plants (water-lilies). Filter curtains are proposed to extend from the boardwalk that surrounds the wetland to the lake bottom. Stormwater from the proposed York Street overflow outlet from the biofilter system will be piped to the wetland for treatment. The filter curtains will serve to contain suspended solids and contaminants within the wetland to enhance treatment efficiency.

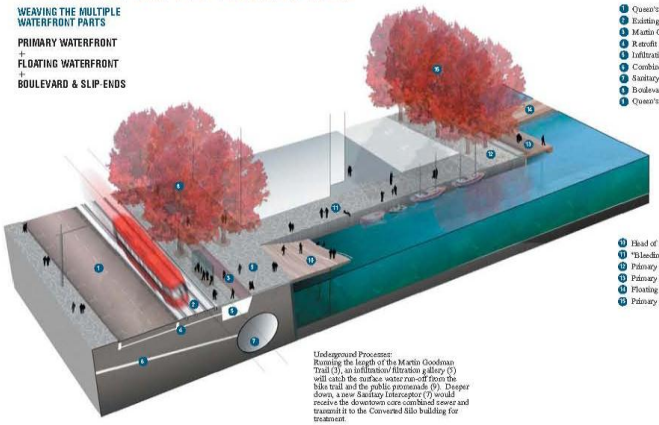
TIMBER PEDESTRIAN BRIDGE CROSSING OVER YONGE SLIP TO THE NEW FERRY TERMINAL

3 Boulevard/Slip-Ends

QUEEN'S QUAY BLVD. STREETSCAPE & DESIGN OF SLIP-END PUBLIC SPACES

WEAVING THE MULTIPLE WATERFRONT PARTS

PRIMARY WATERFRONT
+
FLOATING WATERFRONT
+
BOULEVARD & SLIP-ENDS

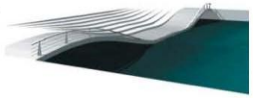


1. Queen's Quay vehicular ROW (2 travel lanes, 1 parking lane)
2. Existing TTC streetcar ROW
3. Martin Goodman Trail (2-way bike lanes)
4. Retrofit w/inverted outlet pips for oil/grit separation
5. Infiltration/Filtration gallery w/ Perforated Storm Sewer
6. Combined Sewer
7. Sanitary Interceptor Tunnel with outflow to Treatment Facility
8. Boulevard Trees (Native Species, varies)
9. Queen's Quay Boulevard Pedestrian ROW
10. Head of Slip Gateway Public Space
11. "Bleeding" of the Boulevard into the "Primary Waterfront"
12. Primary Waterfront Granite Promenade
13. Primary Waterfront Wooden Boardwalk
14. Floating Waterfront Toronto Pontoon
15. Primary Waterfront Double-Row of Maples

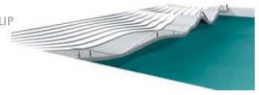
Underground Processes:
Running the length of the Martin Goodman Trail (3), an infiltration/filtration gallery (5) will catch the surface water run-off from the bike trail and the public promenade (9). Deeper down, a new Sanitary Interceptor (7) would receive the downtown core combined sewer and transmit it to the Converted Silo building for treatment.

SPADINA SLIP

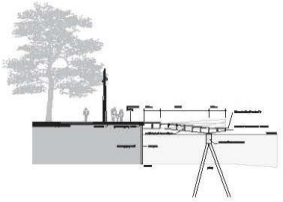
REES SLIP



SIMCOE SLIP



PORTLAND SLIP



4 Culture from the City

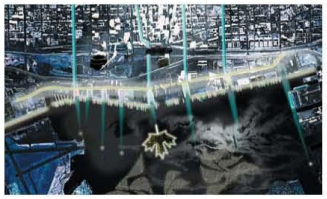
LINES OF CULTURE FROM THE HINTERLAND CLAIM AN ADDRESS WITHIN THE WATERFRONT

VIEW FROM UNDER THE BOULEVARD TREES

VIEW EAST ALONG QUEEN'S QUAY BLVD. AT THE MUSIC GARDEN

VIEW OVER THE SLIP HEAD AT INTERFACE WITH THE BOULEVAR

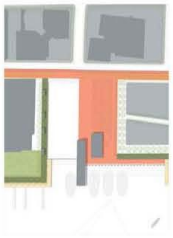
SPADINA SLIP AT NIGHT



LIGHT PROJECTIONS FROM THE SLIP-ENDS AT NIGHT

UNIVERSITY AVENUE/YORK STREET

The city's avenue of civic representation is articulated with the national symbol: the maple leaf. The new park also features a wooden column with a statue of Simcoe.

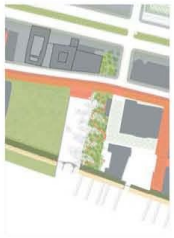


YONGE STREET

The longest street in the world ends at the new ferry terminal and market building, reconstructing the historic Yonge Wharf structures.

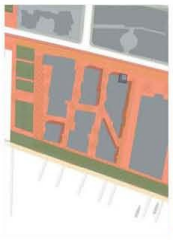
CN TOWER TO THE WATER!

The new park with its stair makes a monumental decsent from the CN Tower to the lake, embedding the previousely "footless" landmark into the city and the waterfront.



REES SLIP

An ideal Canadian Shield shoreline and the canoe and kayak basin will reflect a more distant past...

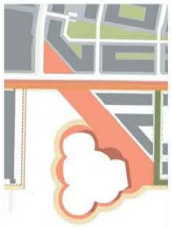


HARBOUR DISTRICT

At the foot of the downtown the Harbour District introduces a smaller grain of urban tissue.

SPADINA

Reflecting in the water, the archway, pier and floating restaurant suggest an extension of the Chinatown out into the lake. A sign of the city's multiple cultures...



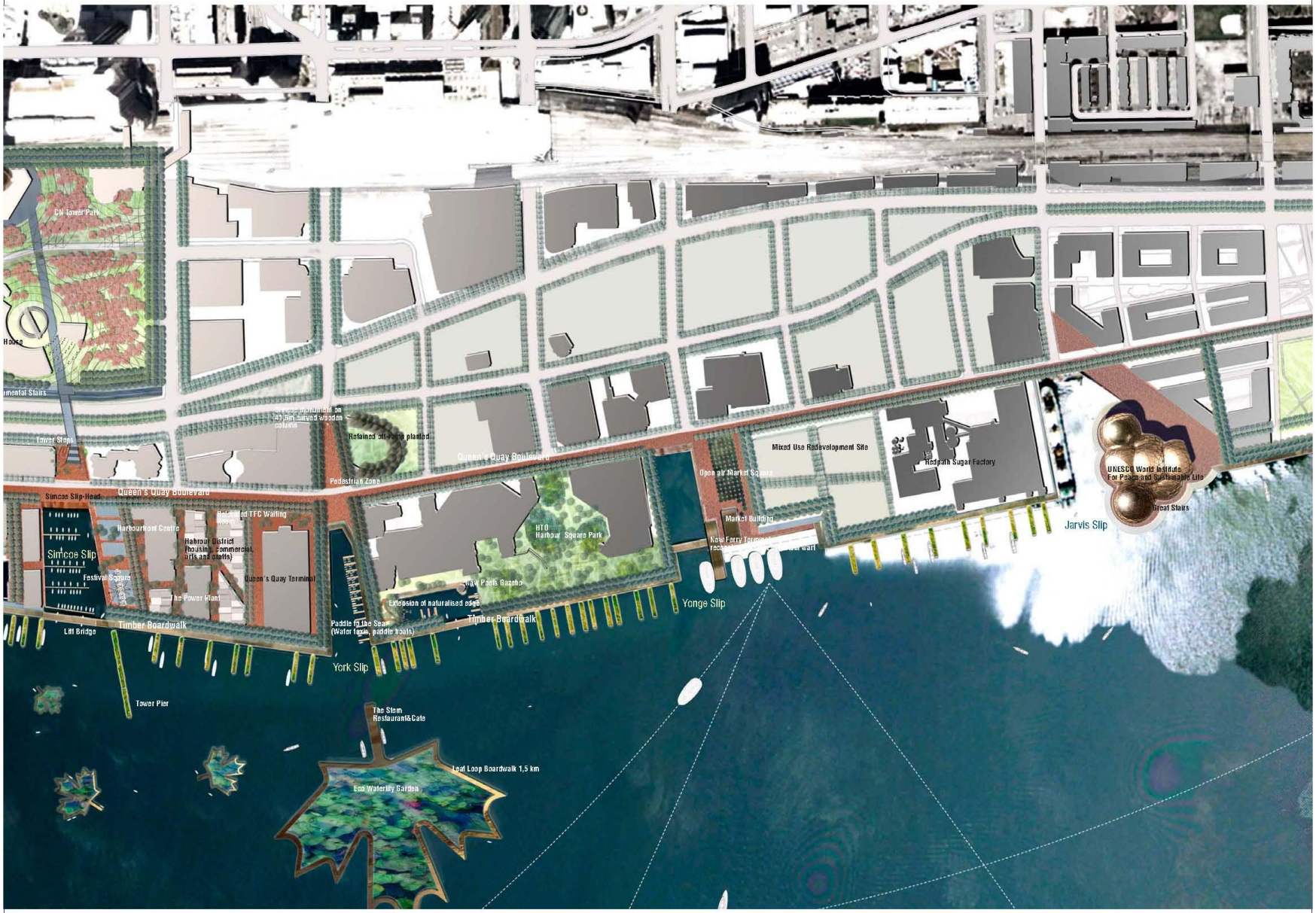
JARVIS STREET

Landmark Institution as the eastern "bookend" for the Central Waterfront.

PORTLAND DISTRICT

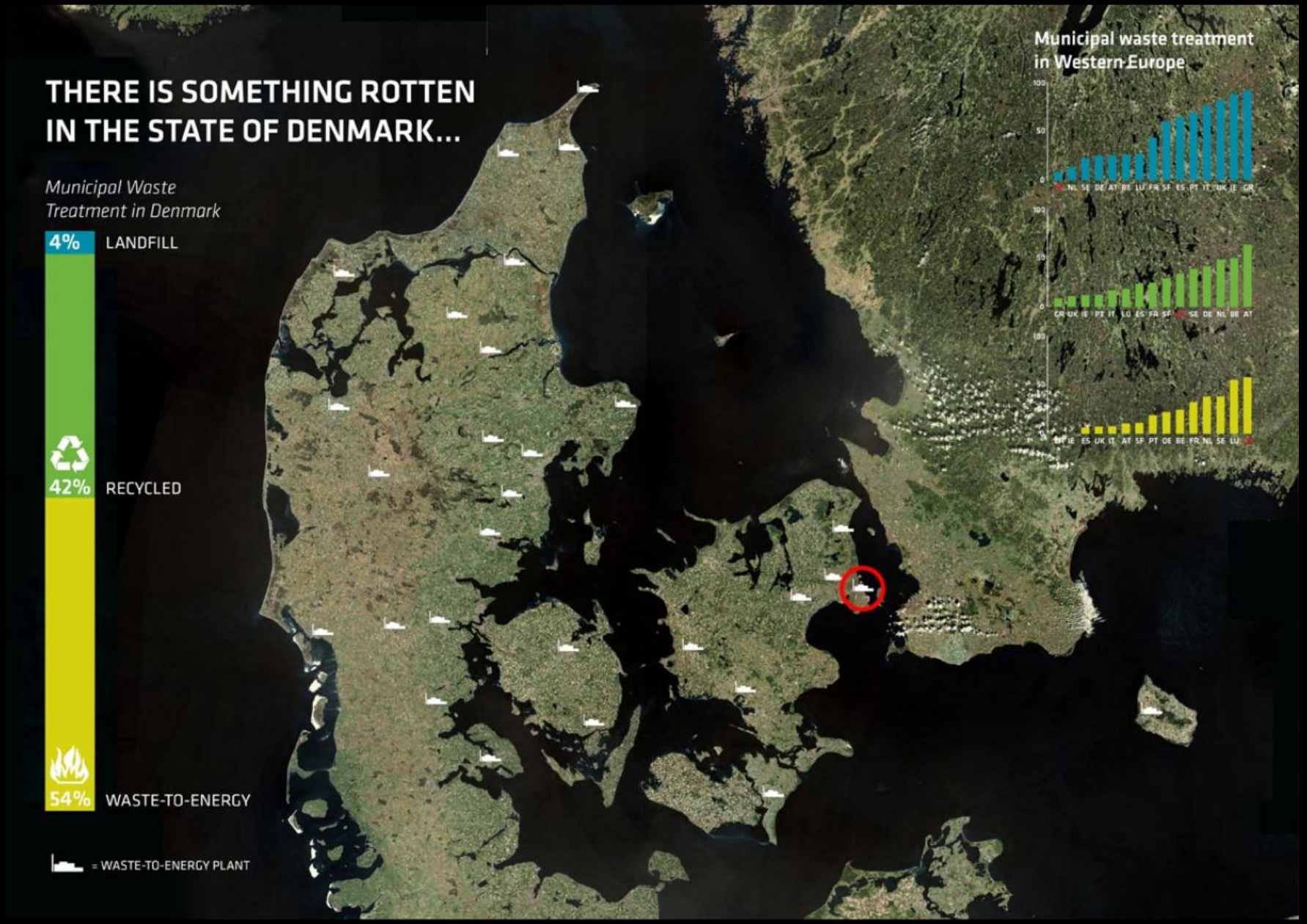
The iconic Canada Malting Silos are retrofitted as a water filtration plant where the ecological processes are made publicly visible.

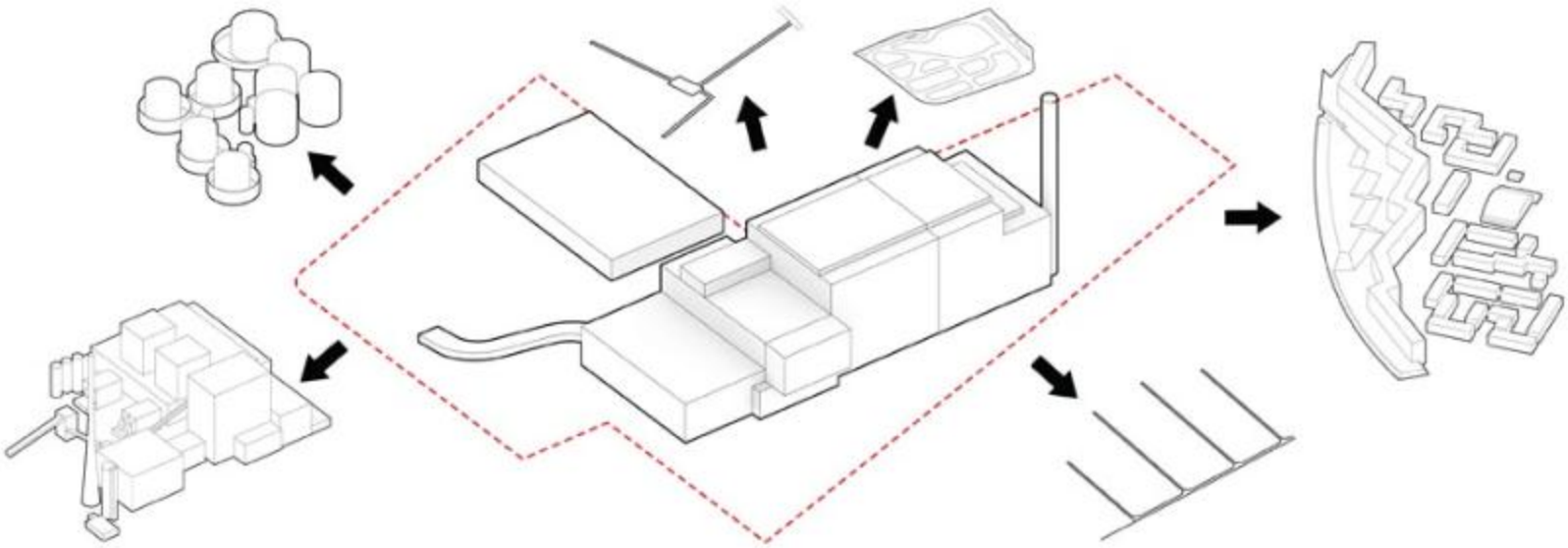

Music Garden
Future Trudeau Memorial Park
Ecological HTO
Children's Playground & Swimming Pool
Spadina Slip-Head
Queen's Quay Boulevard
Rees Slip-Head
HTO Original
HTO Urban Beach
Canoe / Kayak Launch
Beach and Water Forest
Timber Boardwalk
Spadina Slip
Peter Slip
Rees Slip
Portland Slip
Little Norway Park
Silo-Filter Water Filtration Plant & Nightclub
Lions
Floating Chinatown
"0" Arch
HTO West/Little Norway Park Extension
Western Channel
The Round


CN Tower Park
Tower Steps
Simcoe Slip-Head
Queen's Quay Boulevard
Harbourfront Centre
Simcoe Slip
Festival Square
Harbour District (housing, commercial, arts and crafts)
Queen's Quay Terminal
The Power Plant
Lift Bridge
Timber Boardwalk
Pedestrian Zone
Retained old trees planted
HTO Harbour Square Park
Extension of naturalised edge
Paddle (Lake Seal) (Water taxis, paddle boats)
York Slip
Tower Pier
The Stem Restaurant&Cafe
Leaf Loop Boardwalk 1,5 km
Eco Waterlily Garden
Yonge Slip
Timber Boardwalk
Open air Market Square
Mixed Use Redevelopment Site
Redpath Sugar Factory
Market Building
Jarvis Slip
UNESCO World Institute For Peace and Sustainable Life
Great Stairs

COPENHAGEN

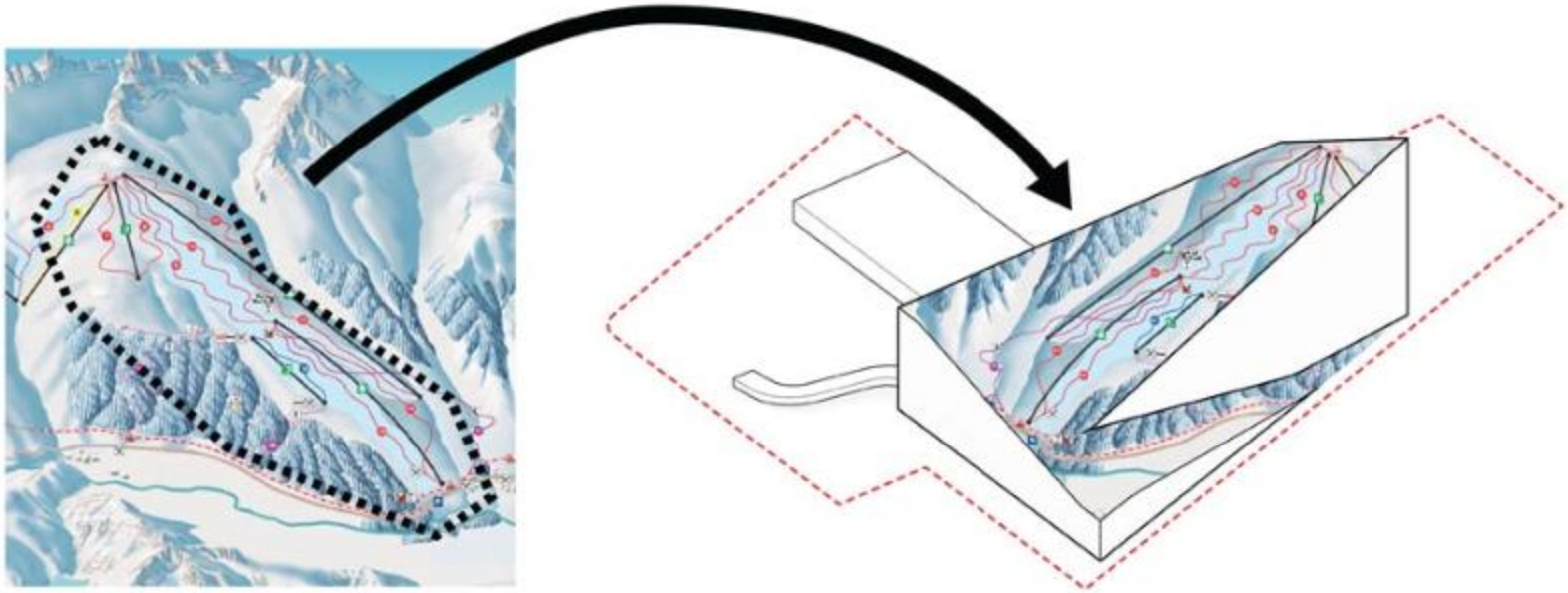
Copenhagen Incinerator Plant http://www.big.dk/


THERE IS SOMETHING ROTTEN IN THE STATE OF DENMARK...
Municipal Waste Treatment in Denmark
4%
LANDFILL
42%
RECYCLED
54%
WASTE-TO-ENERGY
= WASTE-TO-ENERGY PLANT
Municipal waste treatment in Western Europe



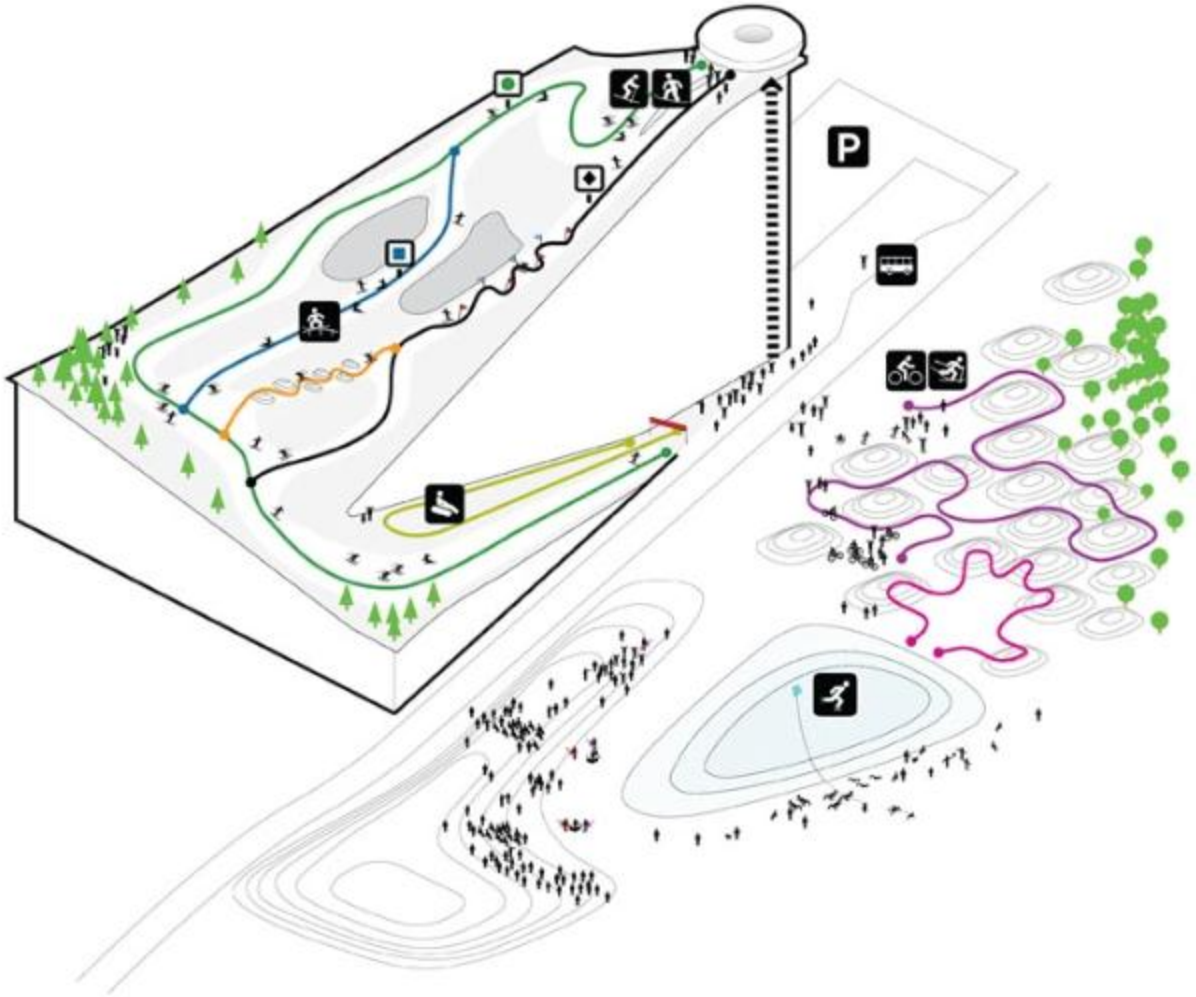
CONTEXT

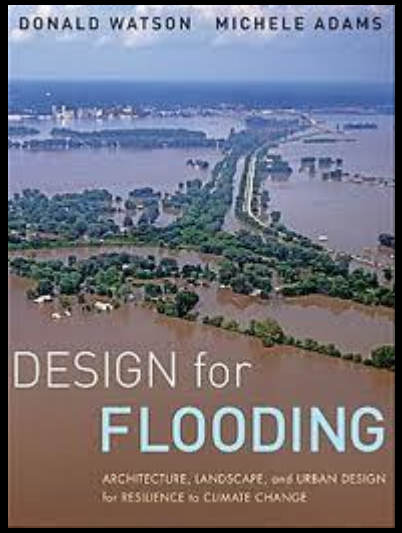
The site is situated in an industrial area just outside the center of Copenhagen, and which is being actively repurposed for recreational and residential developments. Within minutes from the site it is possible to engage in physically challenging sports such as cable skiing, go-karting, sailing, and rock climbing.

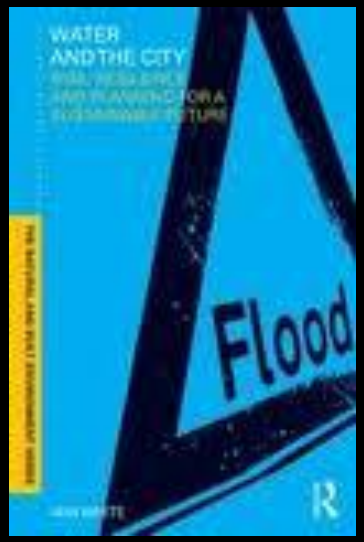


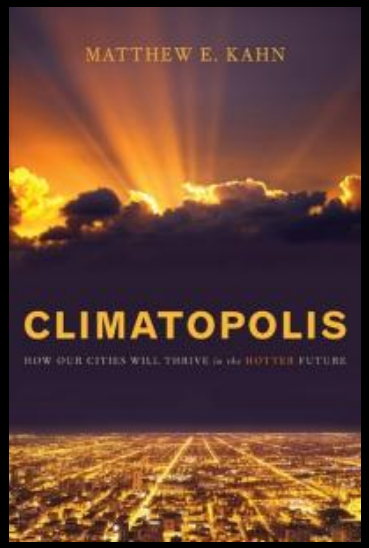
ALPINE SKIING IN COPENHAGEN

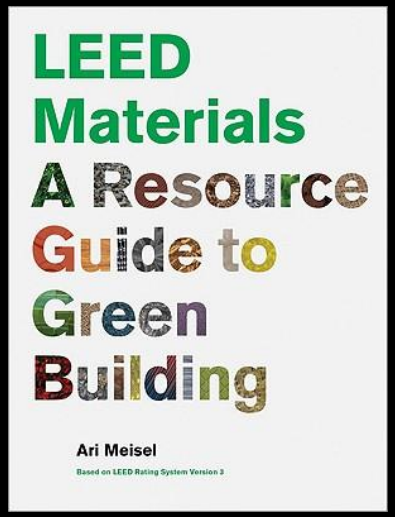
We propose to turn the roof of the new Amagerforbrænding into an artificial ski slope for the citizens of Copenhagen, where it will be possible to ski all year round! The slope will be ecological, upending the convention of the energy intensive indoor or alpine ski resort. The tall height of the internal volume of the plant means that this could be achieved with an average addition of 10m of vertical structure across the roof.

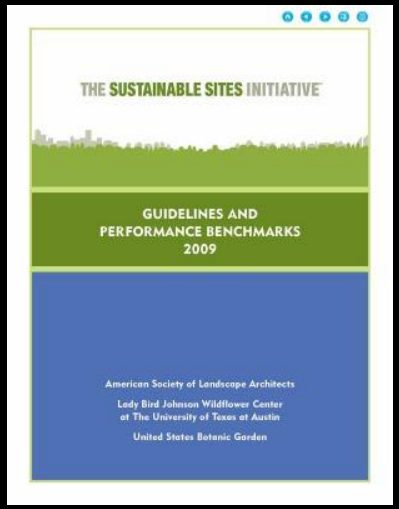

P


DONALD WATSON MICHELE ADAMS
DESIGN for
FLOODING
ARCHITECTURE, LANDSCAPE, and URBAN DESIGN
for RESILIENCE to CLIMATE CHANGE


WATER
AND THE CITY
Flood


MATTHEW E. KAHN
CLIMATOPOLIS
HOW OUR CITIES WILL THRIVE in the HOTTER FUTURE


LEED
Materials
A Resource
Guide to
Green
Building
Ari Meisel
Based on LEED Rating System Version 3


THE SUSTAINABLE SITES INITIATIVE
GUIDELINES AND
PERFORMANCE BENCHMARKS
2009
American Society of Landscape Architects
Lady Bird Johnson Wildflower Center
at The University of Texas at Austin
United States Botanic Garden


HIGH PERFORMANCE
LANDSCAPE GUIDELINES
21ST CENTURY PARKS
FOR NYC
A PROJECT OF THE
DESIGN TRUST
FOR PUBLIC SPACE
AND THE
NEW YORK CITY
DEPARTMENT OF
PARKS & RECREATION
HIGH PERFORMANCE
LANDSCAPE GUIDELINES
21ST CENTURY PARKS
FOR NYC
A PROJECT OF
DESIGN TRUST
FOR PUBLIC SPACE
City of New York
Parks & Recreation

Louise Harpman | NYU | Gallatin School of Individualized Study | Wagner School of Public Service