Ask the Climate Question:

Adapting to Climate Change in Urban Regions

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Urban Leaders Adaptation Initiative

Washington, DC (USA)

World Urban Forum 5, Lessons from Practice:

Toward Climate Change Resilient Cities

Rio de Janeiro, Brazil

March 23, 2010

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Dialogue. Insight. Solutions.

- Help governments develop, implement climate policy:
  - US States: California, Connecticut, Massachusetts, Maine
  - Countries: Europe, China, Mexico, Brazil
- Convene international climate negotiator dialogs
- US Climate Policy Initiative
- Transportation and Adaptation – Land-use & “Smart Growth”
- Urban Leaders Adaptation Initiative: Ask the Climate Question

  Mainstreaming climate adaptation

  Risk management & scenarios

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Urban Leaders Adaptation Initiative

- Core funding from the **Rockefeller Foundation**
- Inform & catalyze **local, state, & regional action** on adaptation - **10 partners:**
  - **Chicago, King County, Los Angeles, Miami-Dade County, Milwaukee, Nassau County, New York City, Phoenix, San Francisco, Toronto**
- Develop and share "best practices" and success stories to aid and influence other communities
- Inform US national and state policy needs

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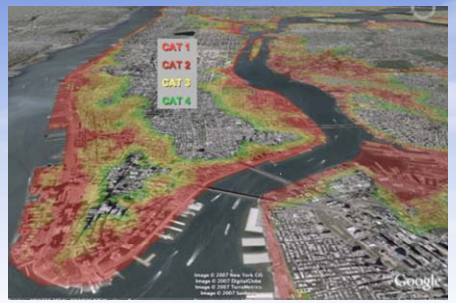
Ask the Climate Question:
Adapting to Climate Change Impacts in Urban Regions

A Report by the Center For Clean Air Policy
Urban Leaders Adaptation Initiative



Ron Sims

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Steve Winkelman

June 2009

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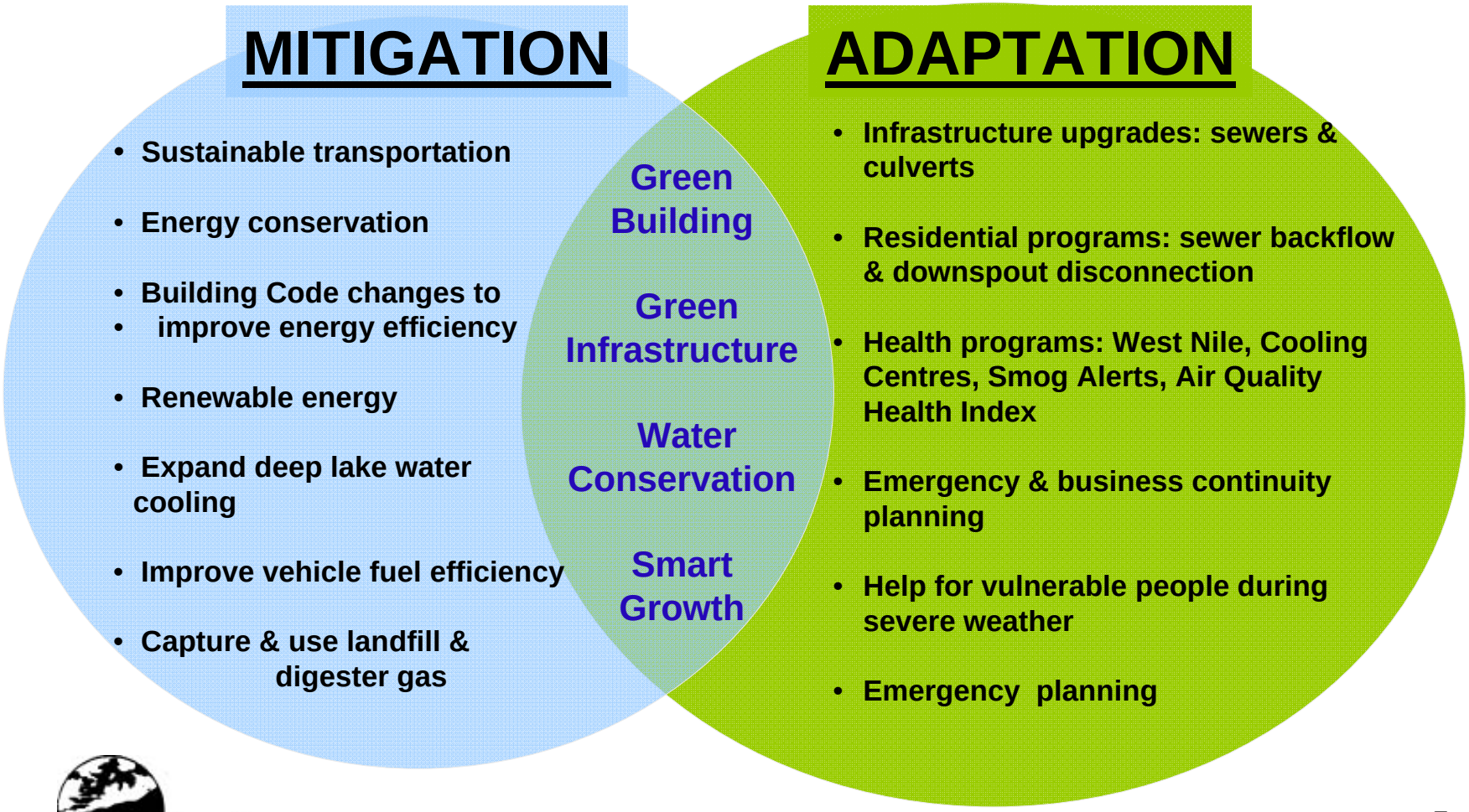
http://www.ccap.org/index.php?component=programs&id=6

Mitigation – Adaptation CoBenefits

Avoiding the unmanageable, managing the unavoidable

Planning…is Preparedness…is Adaptation



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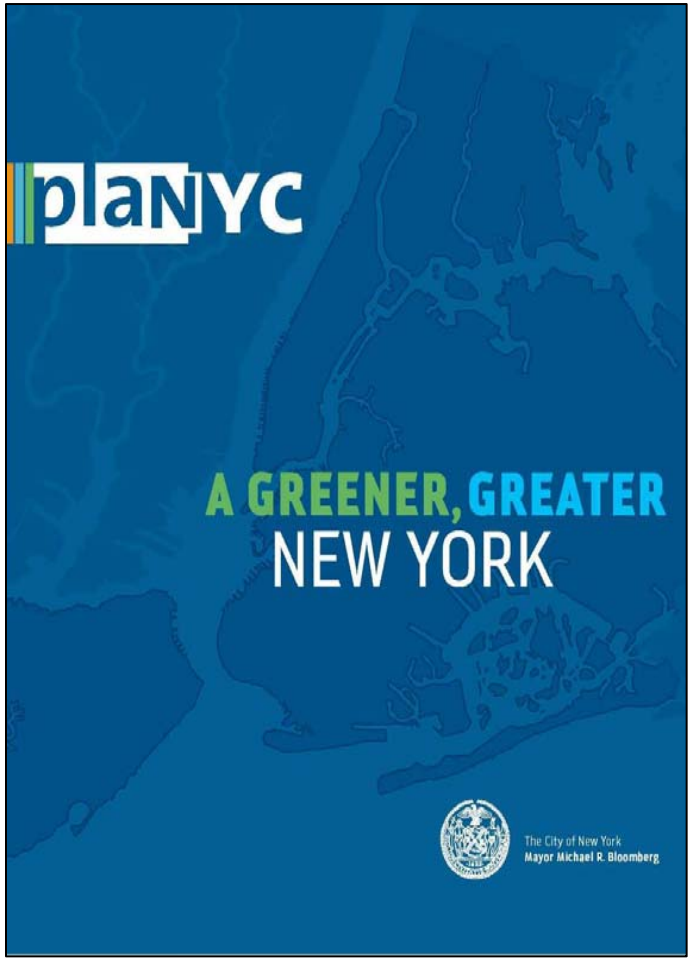
Source: D. MacLeod, Toronto

New York City
Sustainability Framing for Adaptation

- Create enough housing for a growing population
- Ensure all New Yorkers have parks within a 10-minute walk
- Develop water network back-up systems (including stormwater)
- Open 90% of waterways and protect natural areas



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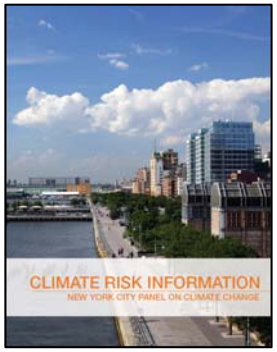
$20B in Water Infrastructure over next 10 years

NYC Adaptation Task Force Adaptation Plan in Spring 2010

NYC-specific climate change projections

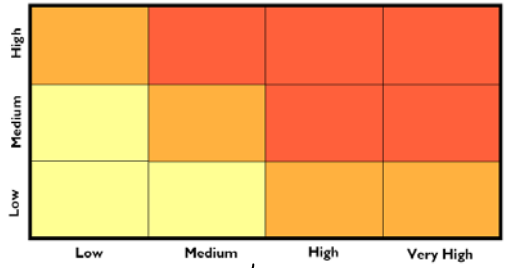


PROJECTIONS

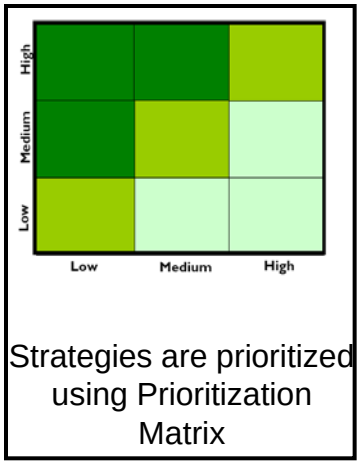
Stakeholder's use projections to identify vulnerabilities

Inventories normalized by sector through the working groups and policies and regulations identified for Policy Working Group review

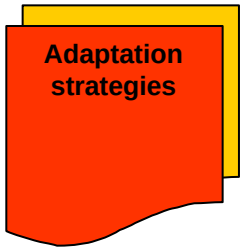
Stakeholder vulnerabilities are prioritized using Risk Matrix



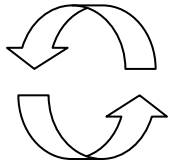
WE ARE HERE



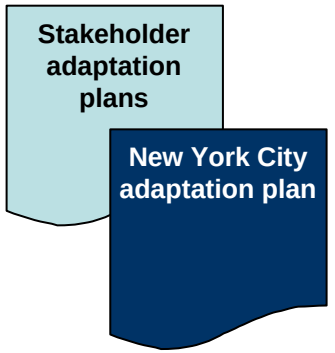
Strategies are prioritized using Prioritization Matrix



Adaptation strategies are developed for high priority risks



Strategies are coordinated among Task Force members



Adaptation plans are developed, including recommendations for policy and regulatory changes

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New York City

Source: A. Freed

The Adaptation Task Force is the first effort of its kind to include representatives from the local, state, and federal government and the private sector

City Agencies
- Dept. of Buildings
- Dept. of City Planning
- Dept. of Design & Construction
- Dept. of Environmental Protection
- Dept. of Health
- Dept. of Law
- Dept. of Parks & Recreation
- Dept. of Sanitation
- Dept. of Transportation
- Economic Development Corp.
- Office of Emergency Management
- Office of Management & Budget

State Agencies/Authorities
- Dept. of Environmental Conservation
- Dept. of State
- Dept. of Transportation
- Governors Island Preservation and Education Corporation
- Hudson River Park Trust
- Metropolitan Transportation Authority
- NY Power Authority
- NYS Public Service Commission
- NJ Transit
- Port Authority of NY/NJ
- State Emergency Management Office

Federal Agencies
- Amtrak
- National Park Service

Private Companies
- Astoria Energy LLC
- AT&T
- Cablevision
- Con Edison
- CSX
- National Grid
- NRG Energy
- NY Independent System Operators
- Sprint Nextel
- Suez Energy, NA
- Time Warner Cable
- T-Mobile
- TransCanada
- USPowerGen
- Verizon

New York City

Source: A. Freed

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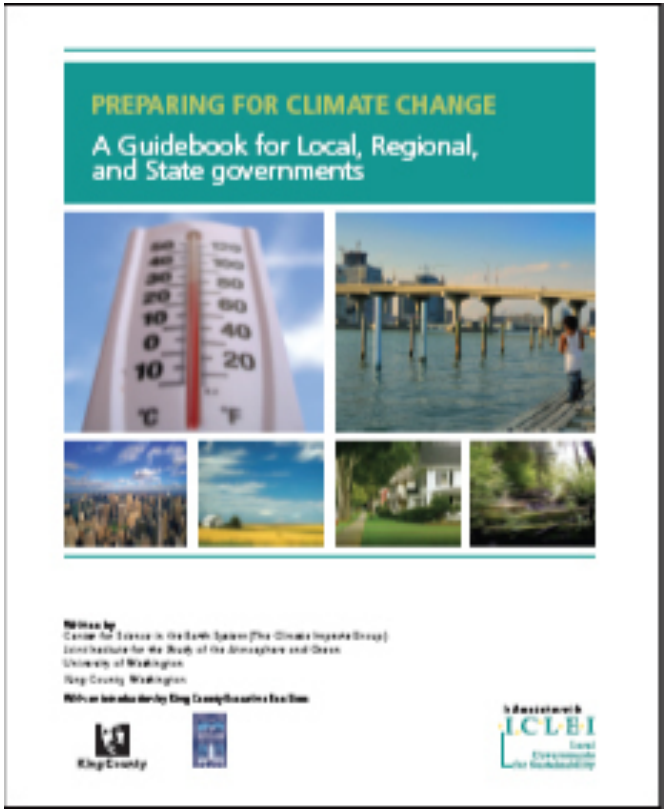
Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments

cses.washington.edu/cig/fpt/guidebook.shtml

by King County (Washington), University of Washington, ICLEI, NOAA



Guide for Action

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University of Washington & King County:

1: Initiate your climate resiliency effort

2: Conduct a climate resiliency study

3: Set preparedness goals and develop your preparedness plan

4: Implement your preparedness plan

5: Measure your progress and update your plan

How is King County Adaptation Preparation and Planning Going?

- Comprehensive Planning
- Flood Planning
- Reclaimed Water Efforts
- Sea level rise assessment by the Wastewater Treatment Division
- Transportation Infrastructure
- Carbon Sequestration and Ecosystem Resiliency on Public and Private Lands

Brightwater Treatment Plant construction

West Point Treatment Plant Seattle, Washington

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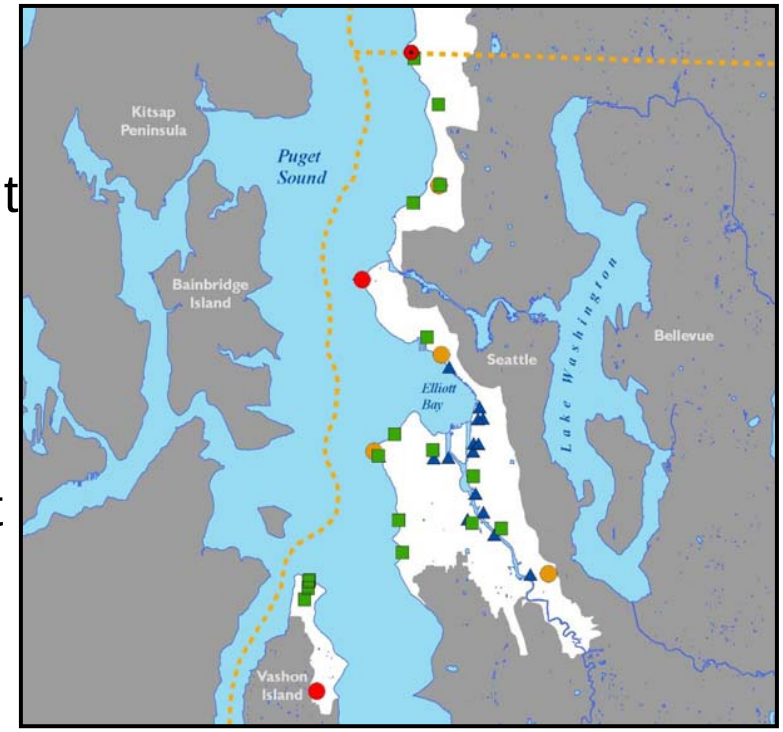
King County - Vulnerability of Wastewater Facilities to Flooding from Sea-Level Rise

- With University of Washington:
  Develop and conduct GIS based methodology combining sea level rise projections + storm surge, compared to facility elevations
- Recommendations include:
  - Raise elevation of Brightwater sampling facility and flow monitor vault sites.
  - Raise weir height and install outfall flap gate for Barton Pump Station improvements.
  - Conduct terrain analysis of five lowest sites and West Point Treatment Plant.



Source: M. Kuharic

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King County Transportation Infrastructure

- New $24 million Tolt Bridge spanning the Snoqualmie River has been built with longer spans than the previous bridge, increasing its capacity to withstand high flows and major flooding events

- More than 57 smaller "short span" bridges are planned to be replaced with wider span structures, allowing debris and floodwater to pass underneath without backing up river levels
  - Culverts that will increasingly be at risk of chronic flooding and road failure, and would cause destruction of fish habitat during storm events – will be replaced with larger systems not only to prevent roads from failing, but also to improve fish passage

Source: M. Kuharic

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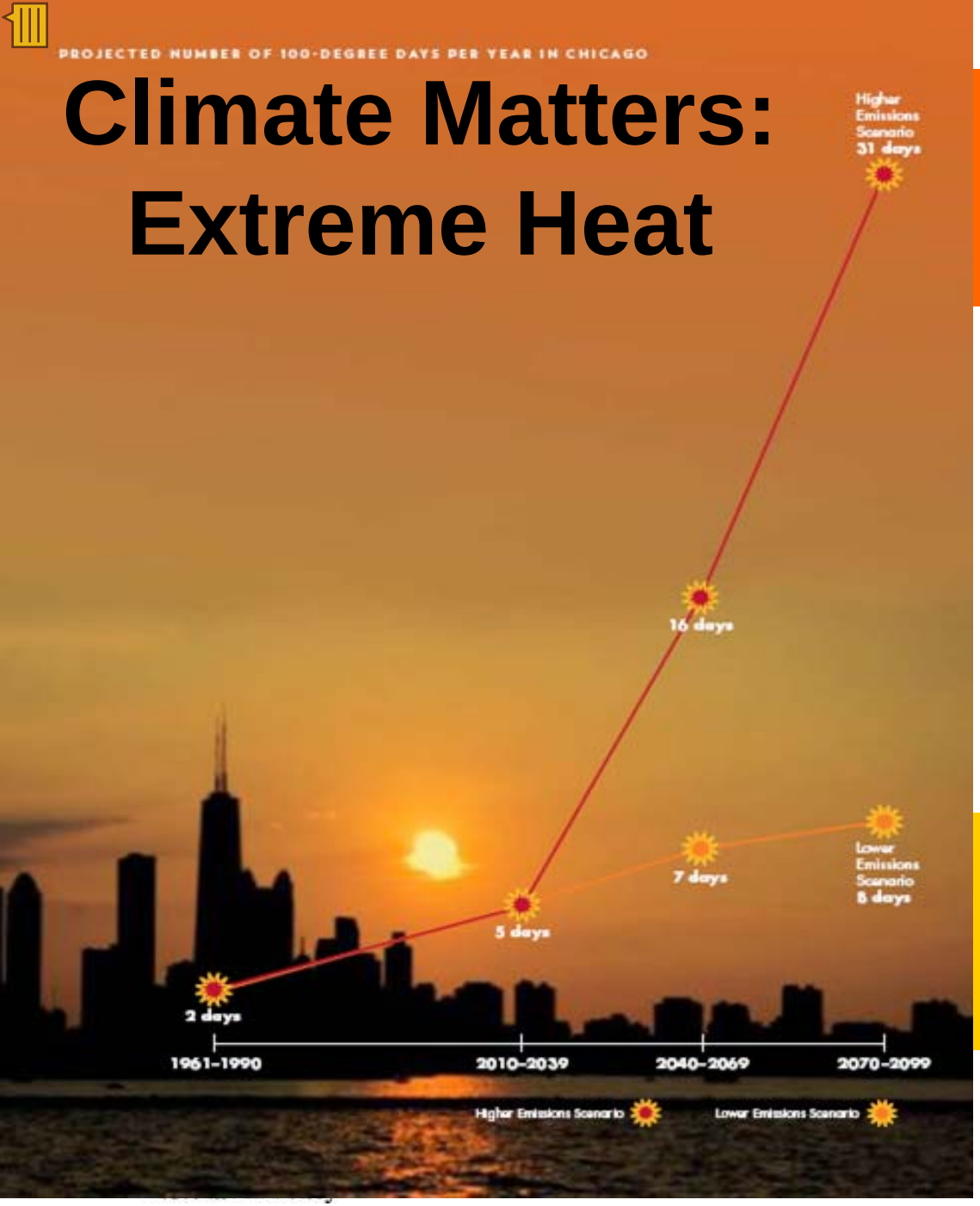
Climate Matters: Extreme Heat



Higher Emissions:
31 days

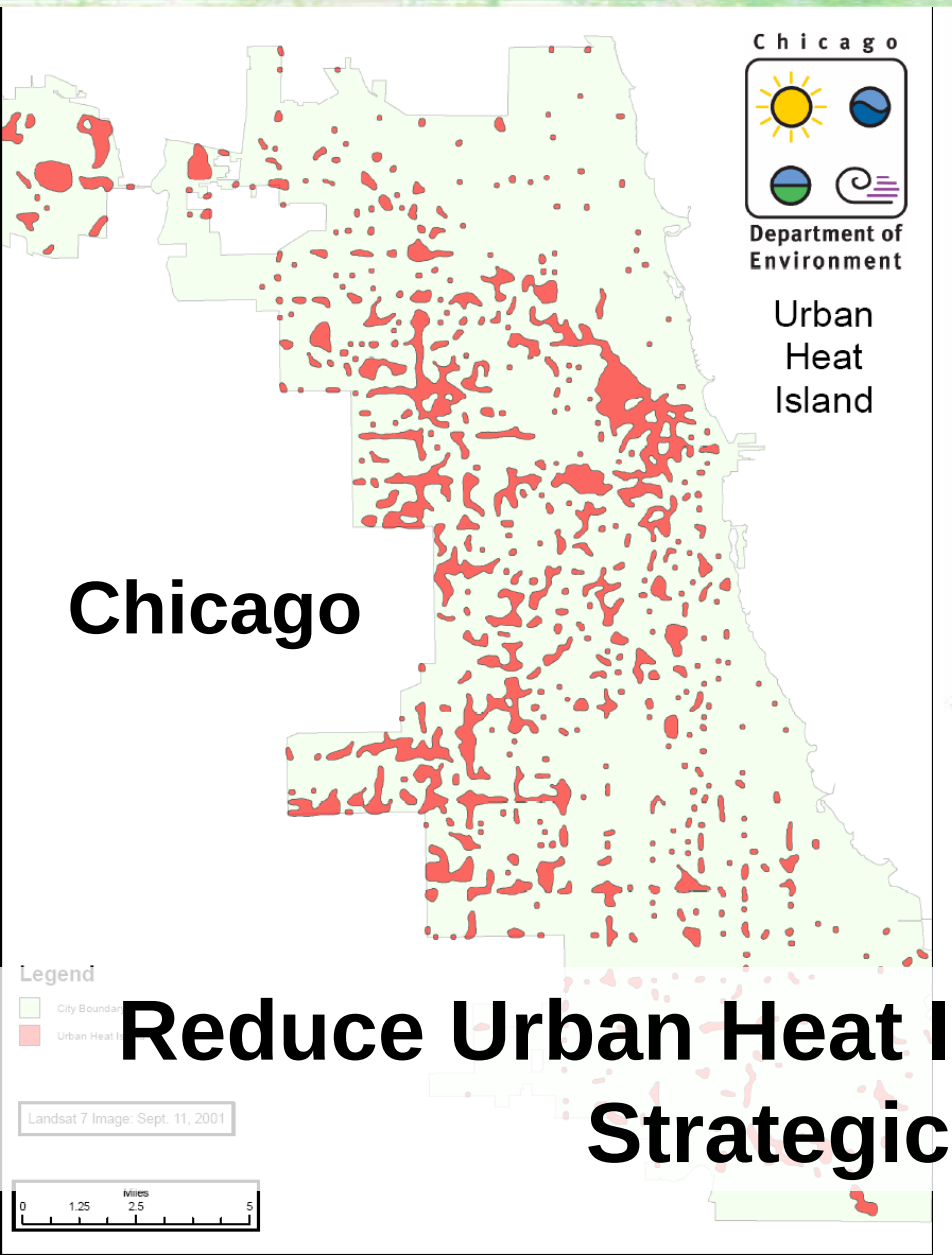
Projected number of 100-degree days per year in Chicago

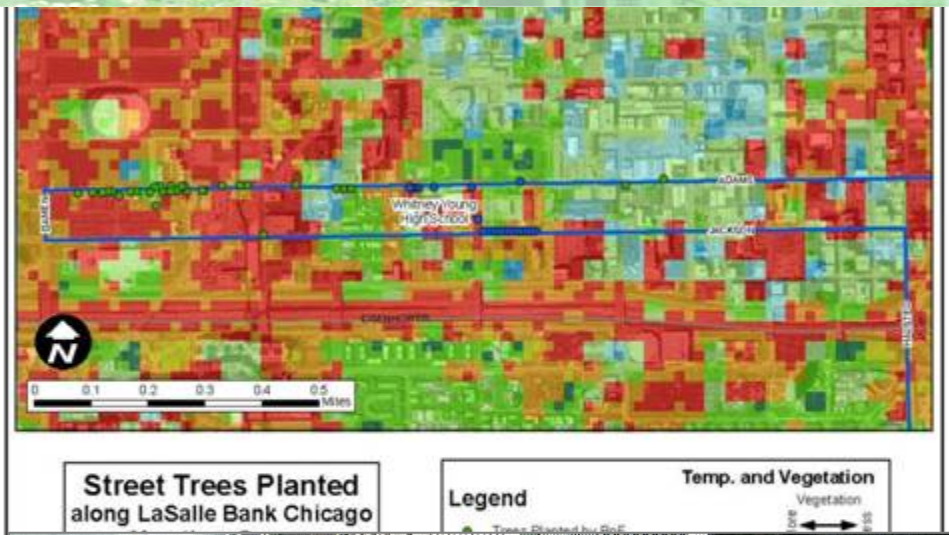
Lower Emissions:
8 days

Chicago

Source: J Coffee

Adaptation: Extreme Heat Events





Reduce Urban Heat Island Effect Through Strategic Planning

Source: J Coffee

Adaptation: Extreme Heat Events

Chicago
Undertake Innovative Cooling Strategies

Center for Clean Air Policy

Source: J Coffee

Lessons Learned *(In and Of Process):* Creating the Chicago Climate Action Plan

http://www.chicagoclimateaction.org/pages/research___reports/8.php

- Process Evaluation for Adaptation Planning
- <u>Context & Timeline</u>:
  - Scientific Assessment
  - Local Govt. Actors
  - External Stakeholders
  - Funding: who & how

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EXTRA SLIDES

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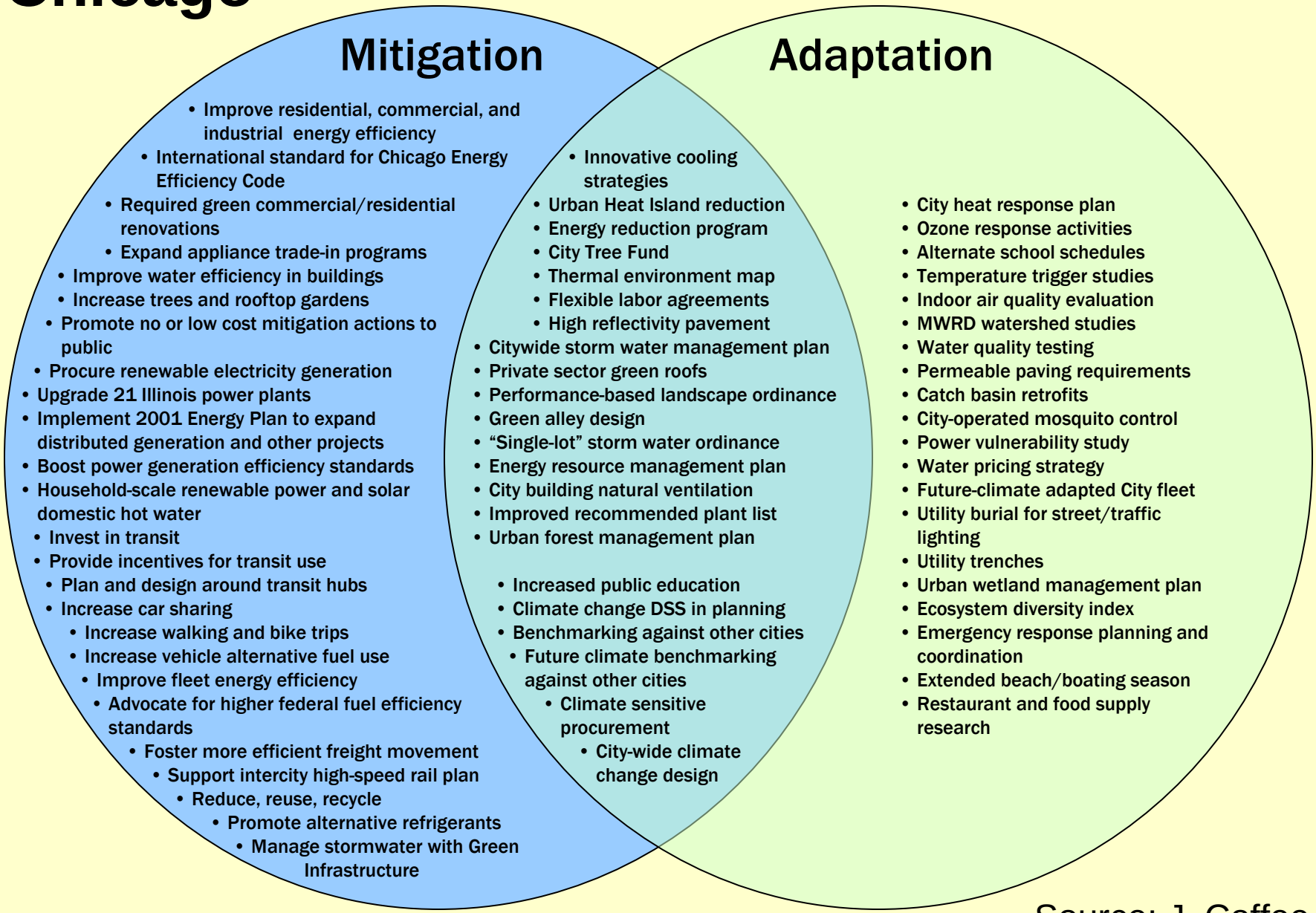
Chicago



Source: J. Coffee

ASK THE CLIMATE QUESTION: MAINSTREAMING ADAPTATION

- What we plan, fund, or build where and how:
  - land-use, development, transportation
- Daily decisions made by:
  - mayors, city managers, citizens & business
- All directly affects:
  - greenhouse gas (GHG) emissions, and
  - resilience to climate change
- How we mitigate and adapt is risk management:
  - Science, models, scenarios, decision support tools
    - Making people part of the solution
    - Spurs innovation at the local, state, & regional levels

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The Face of Mitigation

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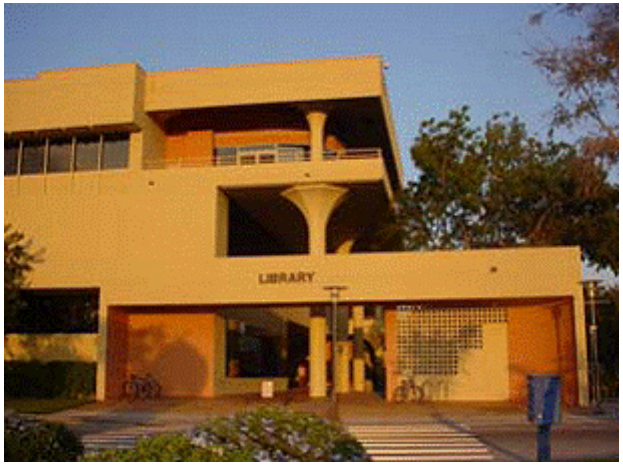
The Face of Adaptation?

The Real Face of Adaptation



Good News - We're Already Doing It!

Urban Leaders partners, states, & regions already have many of the skills needed for climate risk management through their experience in:

- Hazard Mitigation
- Emergency Response
- Flood Management for Extreme Precipitation
- Coastal Management
- Water Conservation
- Water Supply Planning for Droughts
- Green infrastructure – Green Roofs, Urban Forestry
- Smart Growth Land Use Policies

BUT LEADERSHIP IS NEEDED!

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New York City Cities Faces a Number of Challenges in Attempting to Adapt to Climate Change

- Availability (or over-availability) of climate change projections
- Frequent disconnect between research and practitioners
- Overlapping jurisdictions
- Need to build beyond current specifications
- Getting stakeholders to focus on incremental individual actions as well as “big fixes”
- “Day After Tomorrow” syndrome
- Confusion over what it means to adapt

Source: A. Freed

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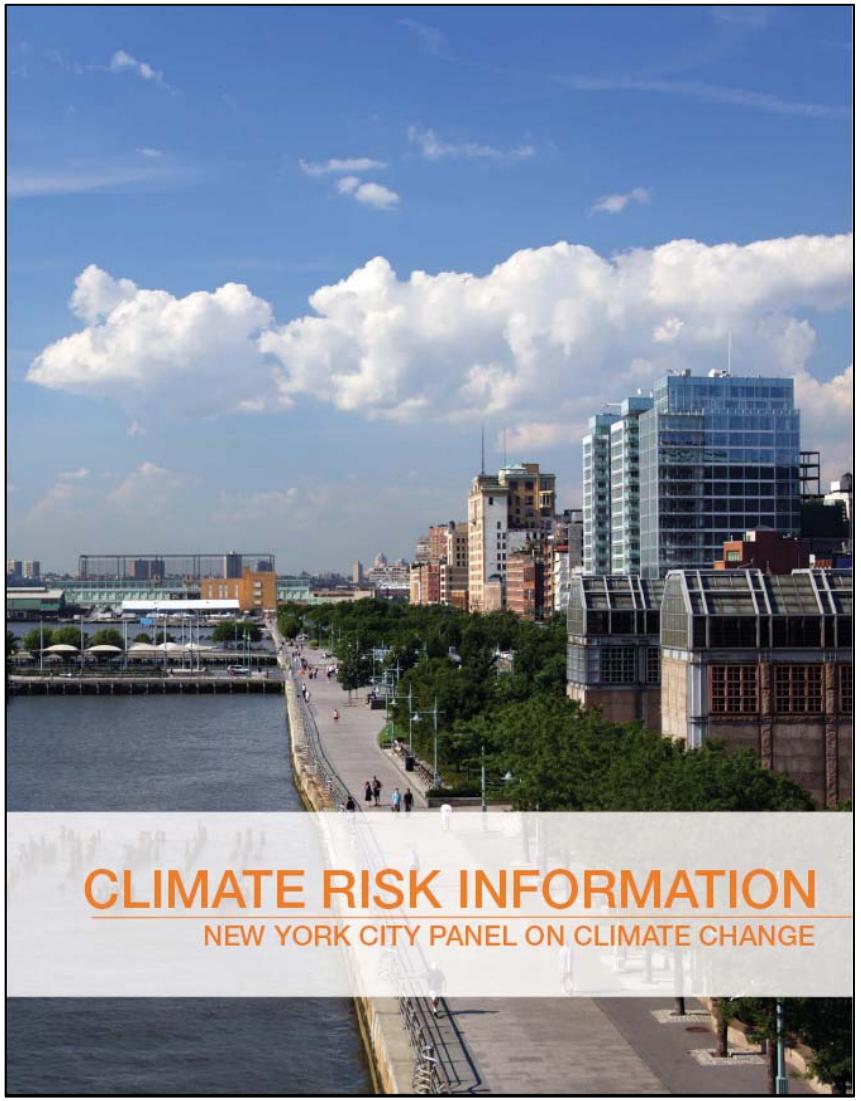
NYC Climate Change Projections

COLUMBIA UNIVERSITY



NASA-GISS Center NYC

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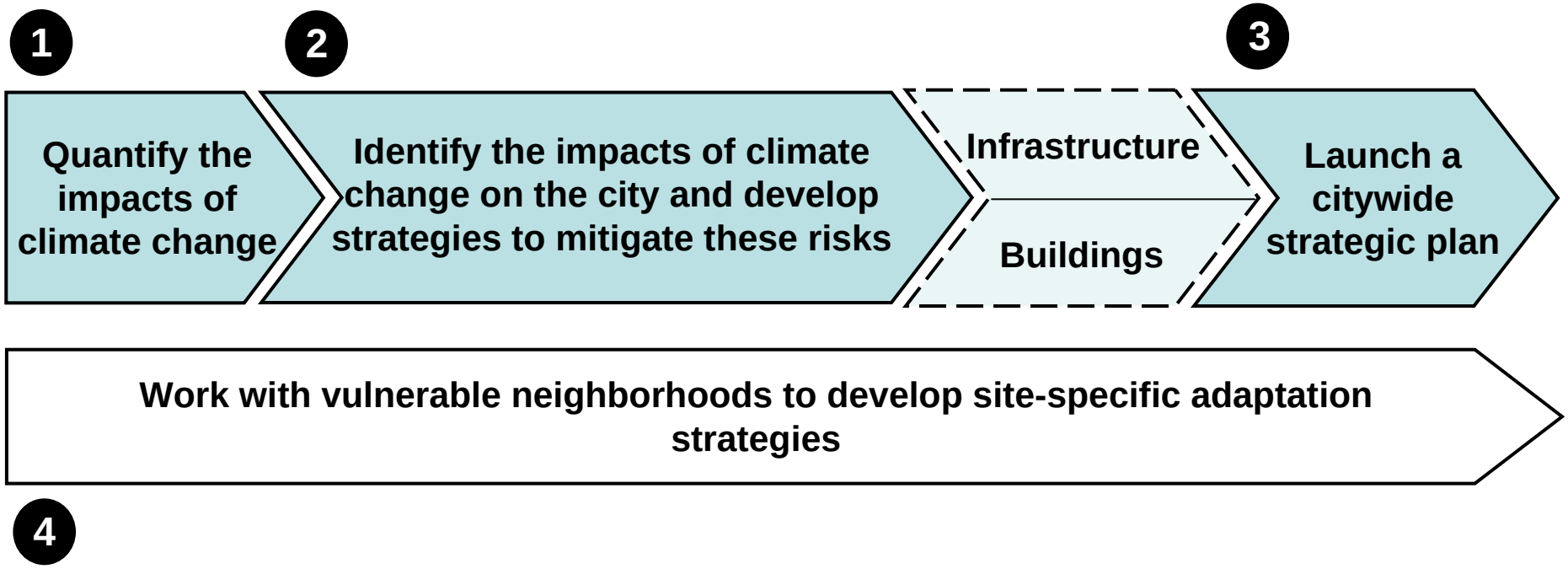
Source: A. Freed

TABLE 1.

Baseline Climate and Mean Annual Changes
(Relative to Baseline Years for New York City)[1]

	Baseline 1971-2000[2]	2020s	2050s	2080s
Air temperature Central range[2]	55° F	+ 1.5 to 3°F	+ 3 to 5°F	+ 4 to 7.5°F
Precipitation Central range[2]	46.5 in	+ 0 to 5 %	+ 0 to 10 %	+ 5 to 10 %
Sea level rise[3] Central range[2]	NA	+ 2 to 5 in	+ 7 to 12 in	+ 12 to 23 in
Rapid Ice-Melt Sea Level Rise[4]	NA	~ 5 to 10 in	~ 19 to 29 in	~ 41 to 55 in

PlaNYC has a Four-step Approach to Climate Change Adaptation



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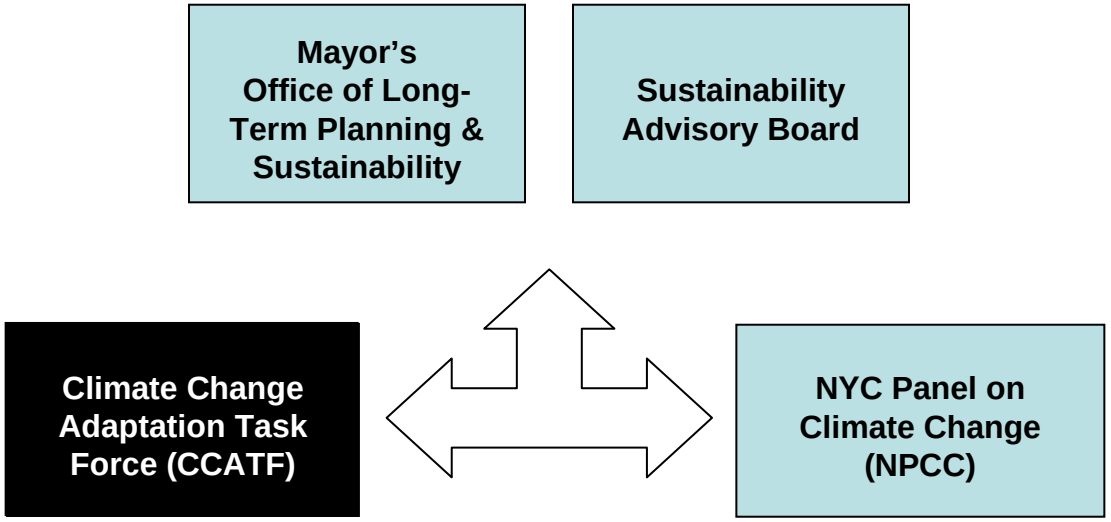
Source: A. Freed

Identify the Impact of Climate Change on the City and Develop Strategies to Mitigate these Risks



CCATF

- 12 City agencies
- 5 Regional public authorities
- 6 State agencies
- 2 Federal agencies
- 15 Private companies

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New York City

Source: A. Freed

NYC - What we have learned so far?

- All elements of NYC's infrastructure could be effected by climate change to varying degrees
- **Stakeholders are already taking steps to help them adapt (even if they don't call it adaptation)**
- Many Task Force members already operate infrastructure in climates similar to NPCC projections
- Many adaptation actions will take place in the next generation of equipment
- Incremental changes can have as large an impact as extreme events
    - Initial adaptation planning can occur without precise projections

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Source: A. Freed

Green Infrastructure Adaptation NEW YORK CITY = Cost Savings

- Invested $600M in protecting Catskill Watershed

  SAVED:

  – **$6 Billion** in water filtration construction

  – **$200-300M** in operations & maintenance

- **Green Streets, urban forestry, rain barrels: 3-6 x more effective in managing stormwater per $1000**

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Source: House Committee on Transportation and Infrastructure, Hearing, 2/4/09

Adaptation Work Groups

Chicago Climate Change Task Force

Chicago Mayor's Office

Work Groups and their Leading Department

Extreme Heat: Office of Emergency Management and Communications

Extreme Precipitation: Department of Water Management

Buildings, Infrastructure & Equipment: Department of Buildings and Department of Transportation

Ecosystems: Department of Zoning and Land Use Planning

Leadership, Planning and Communication: Department of Environment

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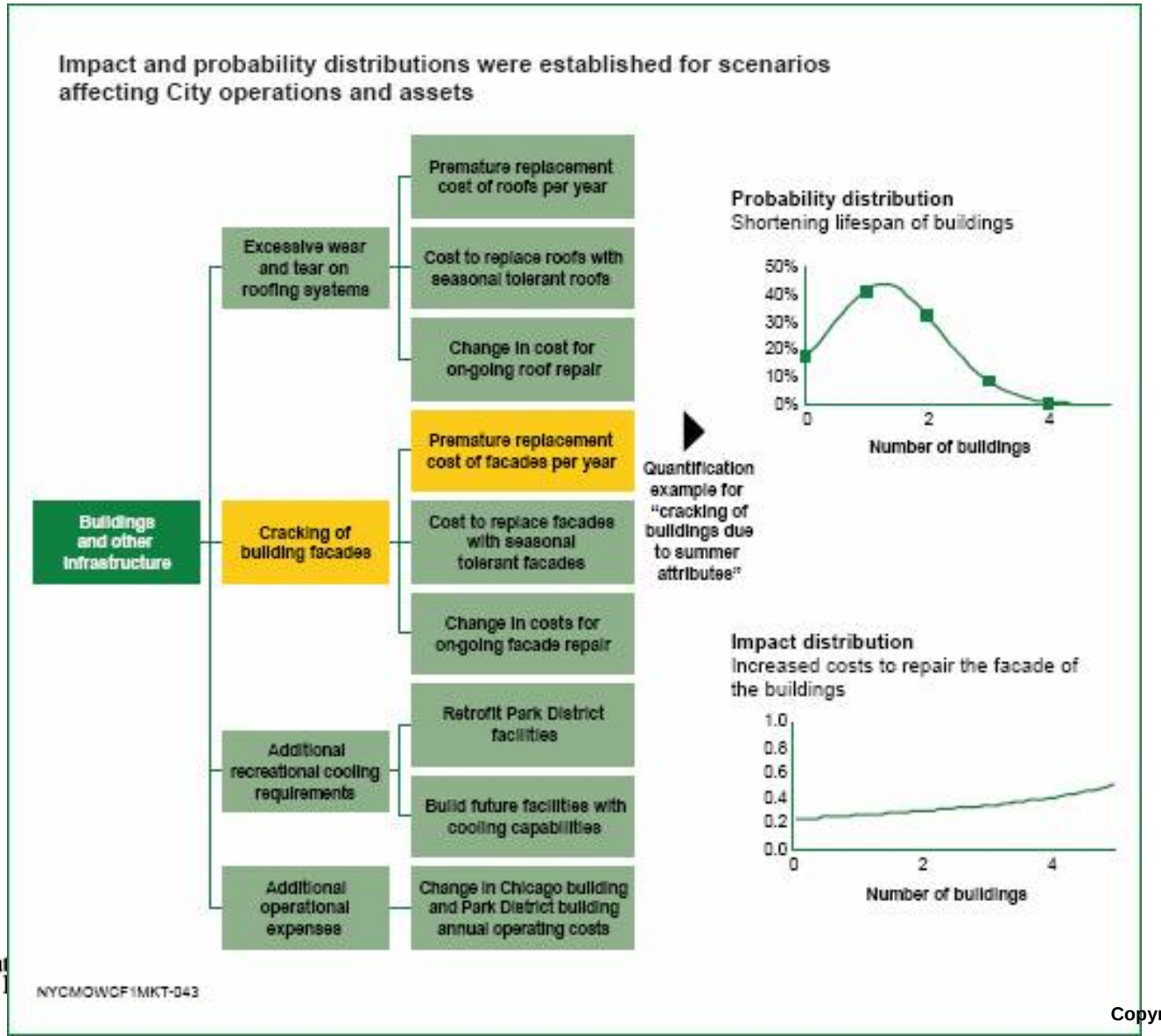
CHICAGO Economic Risk Analysis via Scenarios



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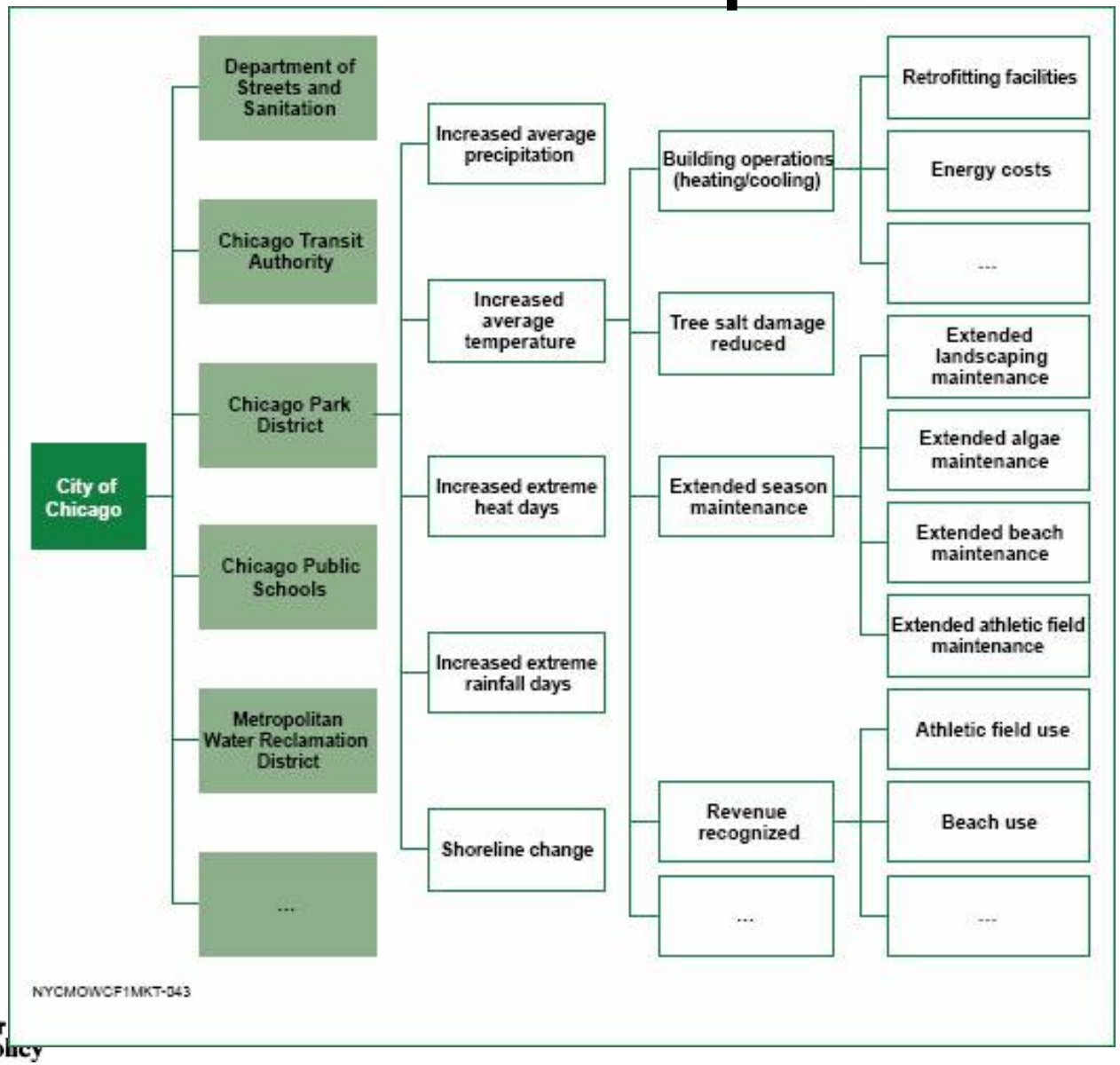
Decision Pathway for Adaptation Actions for one Department



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125 Potential Adaptation Actions

Organized by Risk, Timing and Department

Impact	Risk	Timing **	Construction, Buildings & Property	Tourism	Environment	Fire	Fleet Management	Housing	Human Services	Emergency Management	Police	Public Health	Streets and Sanitation	Transportation	Water Management	Parks and Open Space	Storm Water Management
Need to get greater penetration of A/C to residential units (particularly high risk areas)	Moderate	Near	x					x				x					
Damage to property and increasing cost of insurance due to stormwater	Moderate	Mid	x			x			x			x	x		x		x
Higher costs associated with managing invasive species	Moderate	Mid			x										x	x	
Increased potential for shoreline erosion/ storm damage	Moderate	Mid			x						x					x	
Possibility of higher frequency/severity of storms	Moderate	Mid				x				x	x		x			x	

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King County
Flood Planning and Control

- Up to $335 million to improve King County's system of 500 levees
- Program does roughly 10X the work it used to do
- Increase river capacity, purchase the most susceptible lands

Source:
M. Kuharic

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Planning for Climate Change
"*Preparedness is Adaptation*"

- **Risk Management Framing: no or low cost actions**
- **Adaptation may increase resilience to risks**
- **One tool: developing and evaluating scenarios**
- **Goal: avoid greater future costs - examples:**
  - **"Build with the Future in Mind": better urban design & planning without necessarily greater costs**
  - **Plan to relocate key facilities if needed because of climate change impacts - like sea level rise**
  - **Contingency Contracts: arrange to spend funding in advance of disasters**
  - **Insurance & Finance: adapt=lower premiums & loan rates**
    - **Timing of public policy action is key!**
    - **Key Barrier: Issue of short-term benefit vs. long-term liability**

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NEW FRAMING for ADAPTIVE BEHAVIOR BENEFITS VS. COSTS OF INACTION

INCENTIVIZE via SUSTAINABILITY

"PROSPERITY SECTOR": "Live Local and Prosper"

- developers, financiers, insurers, planners, real estate, builders, lawyers (linked to water, transportation, emergency preparedness, public works, public health managers, elected leaders)

Issues—traditional levers of influence:

- planning, urban design, insurance, finance, taxes, tourism, building and zoning codes, regulation, property values, green infrastructure and buildings, smart-growth, and density

Fora – States Could Provide?:

- a need to bring together for dialog these sectors that have a role in climate adaptation but may not yet think of themselves as having that role yet

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