

C40 and Coastal Cities

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C40 Cities

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Who is C40?



12% of Global Population

1/3rd Global Economy

AFRICA: ABIDJAN – ACCRA – ADDIS ABABA – CAPE TOWN – DAKAR – DAR ES SALAAM – DURBAN (ETHEKWINI) – EKURHULENI – FREETOWN – JOHANNESBURG – LAGOS – NAIROBI – TSHWANE | **CENTRAL EAST ASIA:** BEIJING
CHENGDU – DALIAN – FUZHOU – GUANGZHOU – HANGZHOU – HONG KONG – NANJING – SHANGHAI – SHENZHEN – QINGDAO – WUHAN – ZHENJIANG | **EAST, SOUTHEAST ASIA & OCEANIA:** AUCKLAND – BANGKOK – HANOI
HO CHI MINH CITY – JAKARTA – KUALA LUMPUR – MELBOURNE – QUEZON CITY – SEOUL – SINGAPORE – SYDNEY – TOKYO – YOKOHAMA | **EUROPE:** AMSTERDAM – ATHENS – BARCELONA – BERLIN – COPENHAGEN – HEIDELBERG
ISTANBUL – LISBON – LONDON – MADRID – MILAN – MOSCOW – OSLO – PARIS – ROME – ROTTERDAM – STOCKHOLM – TEL AVIV – VENICE – WARSAW | **LATIN AMERICA:** BOGOTÁ – BUENOS AIRES – CURITIBA – GUADALAJARA – LIMA MEDELLÍN – MEXICO CITY – RIO DE JANEIRO – SALVADOR – SÃO PAULO – SANTIAGO – QUITO | **NORTH AMERICA:** AUSTIN – BOSTON – CHICAGO – HOUSTON – LOS ANGELES – MIAMI – MONTRÉAL – NEW ORLEANS – NEW YORK
PHILADELPHIA – PHOENIX – PORTLAND – SAN FRANCISCO – SEATTLE – TORONTO – VANCOUVER – WASHINGTON DC | **SOUTH & WEST ASIA:** AMMAN – BENGALURU – CHENNAI – DELHI – DHAKA – DUBAI – KARACHI – KOLKATA – MUMBAI



C40 Resilience Networks & Accelerators (CSN)

**Urban
Flooding
Network**

37 cities

**Water
Security
Network**

21 cities

**Urban Heat
Network**

38 cities

**Urban
Nature
Accelerator**

39 cities

**Connecting
Delta Cities
Network**

16 cities

**Water
Accelerator**

Coming soon!

MAYORAL LEADS:

Vice chair lead for **adaptation**: Abidjan
Vice chair lead for **urban nature**: Montreal
Lead for **Water Accelerator**: Rotterdam

What we are facing

800 people will live in cities where sea levels could rise by more than half a metre.

MILLION

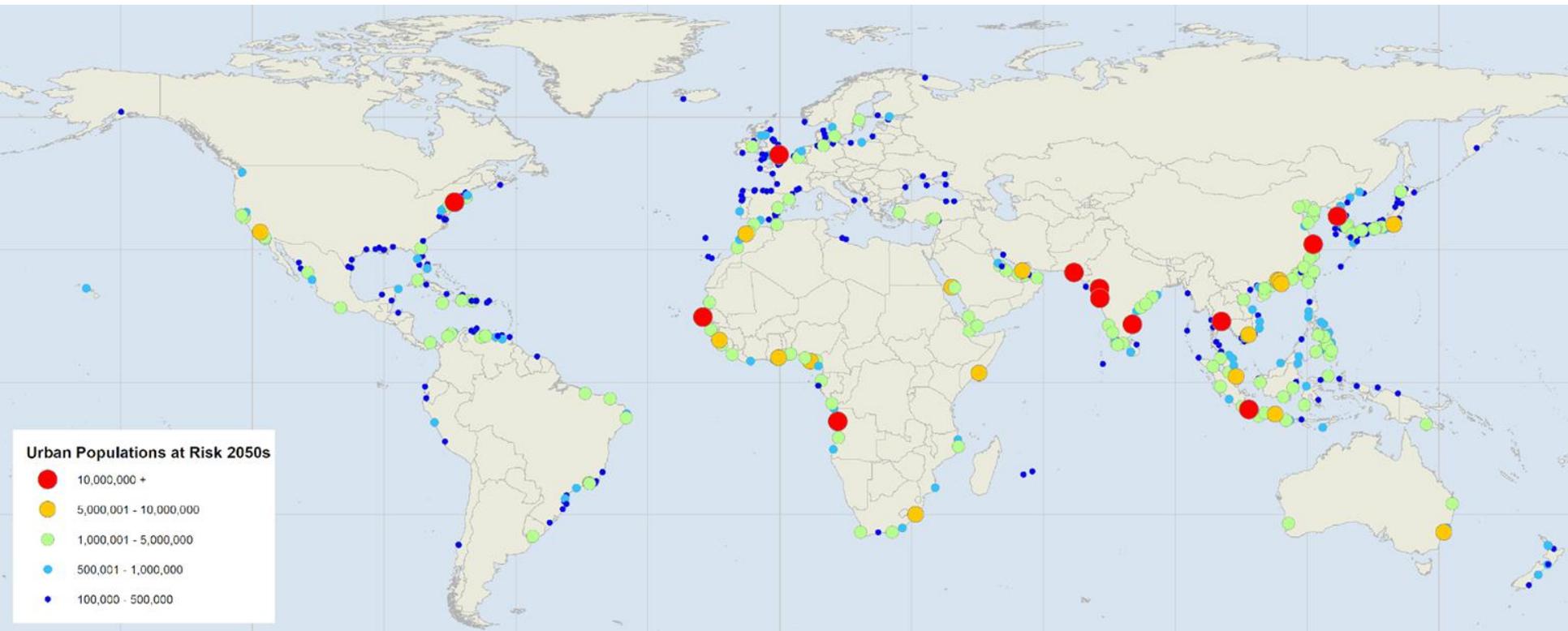
\$19
billion

90,000 buildings were damaged when Hurricane Sandy hit New York. The storm cost the city over \$19 billion.

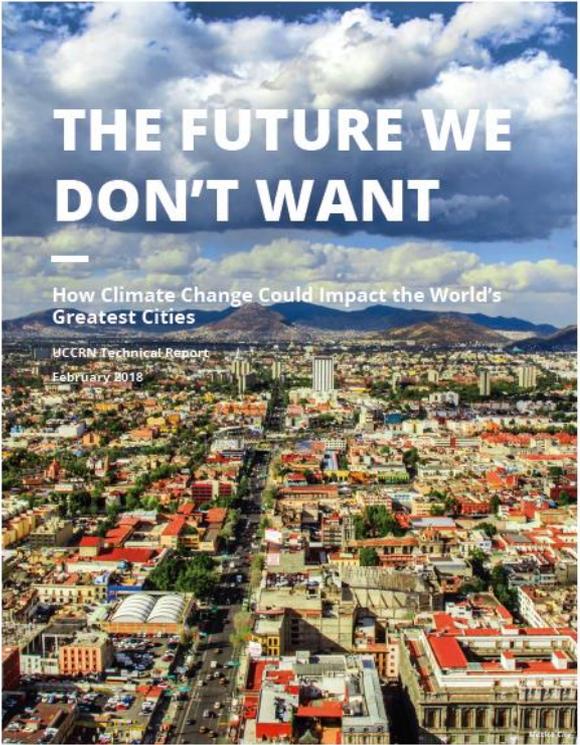


Globally, economic costs to cities from rising seas and flooding could amount to \$1 trillion every year by mid-century.

\$1 trillion



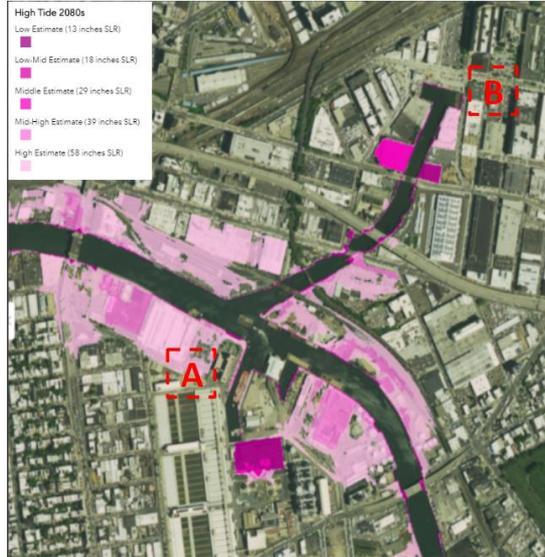
570 cities projected to receive at least 0.5 meters of sea level rise by the 2050s under RCP 8.5



What cities are doing

City Actions

1. Preparedness and Warning
2. Municipal Operations
3. Buffers and Barriers
4. Design and Zoning



CONCEPT OF OPERATIONS
HURRICANE AND SEVERE WEATHER

1 PRE-EVENT TASKS AND ACTIVITIES

- Planning
- Procurement
- Training and Exercise
- Message Considerations

2 FIRST RESPONSE AND SHORT-TERM RECOVERY

2A Coordination Calls

2B Establish Command, Control, and Coordination Structure

- Normal (Joint All-Hazards Operation Center) / Expanded (IC Post, EDC, and/or JIC)
- 2C Sustained Response
- Damage Assessment
 - Logistics Management and Resource Support
 - Bus Distribution
 - Evacuation
 - Community Outreach / Resident Engagement
 - Volunteer Management
 - Search and Rescue
 - Public Information and Warning
 - Information Management and Reporting
 - Critical Infrastructure
 - Sheltering and
 - Monitor

3 TRANSITION TO LONG-TERM RECOVERY AND AAR

- Demobilize Deployed Resources
- Close Operations Centers
- Complete Financial Reconciliation
- Conduct After Action Review

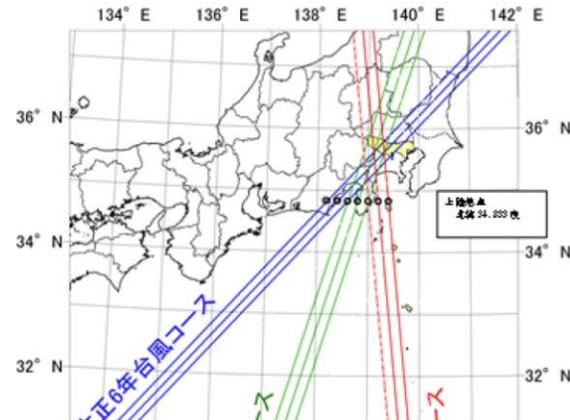
Preparation before Typhoon



First-ever joint video conference of meteorology departments between national and pearl delta cities

- Cross Bureau & Departmental Meetings
- Preparedness and Emergency Services

Preparedness and Warning



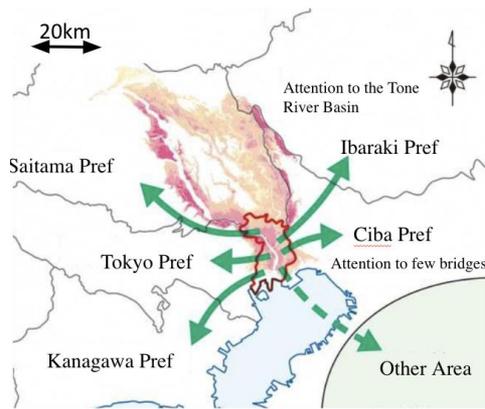
Typhoon A (1917.10)
Select a typhoon route that brought the largest tide deviation (2.1 - 2.3 m) in Tokyo Bay since 1968.

Typhoon B (1949.8)
Select a typhoon route that brought the largest tide deviation (1.4 m) in Tokyo Bay after second world war.

Typhoon C (1959.9)
As an intermediate course of typhoon A and typhoon B, 1959 Typhoon course translated and applied to Tokyo Bay

@DOEE_DC ***

Image of Broad Area Evacuation



Source :Koto 5 Ward large-scale flood disaster broad evacuation plan

72 hours

Local governments start consideration of evacuation information.
930hpa Typhoon or 400mm/3days(Arakawa river basin)

72-24 hours

Announcement voluntary broad evacuation information

24-9 hours

Recommendation voluntary broad evacuation

9-0 hours

Direction vertical evacuation within the region

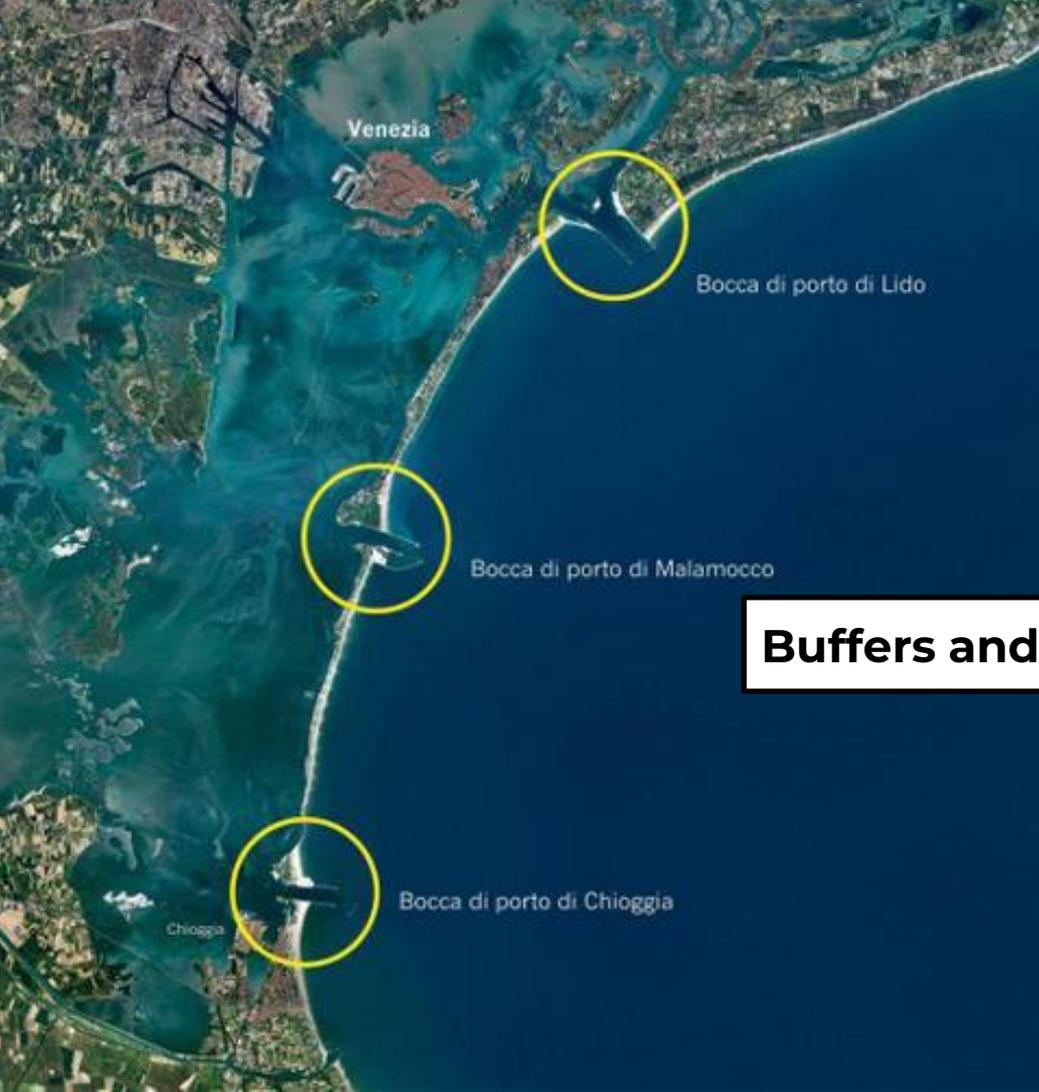




Municipal Operations:

- Energy, Waste, Shipping, Tourism

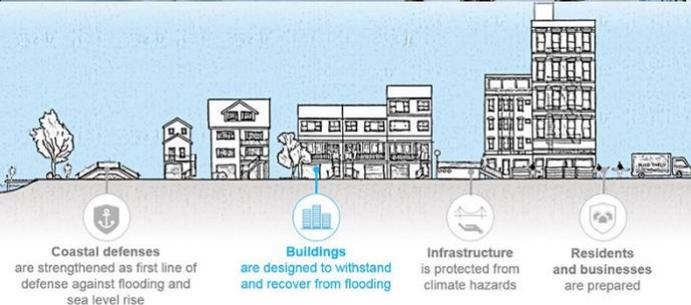
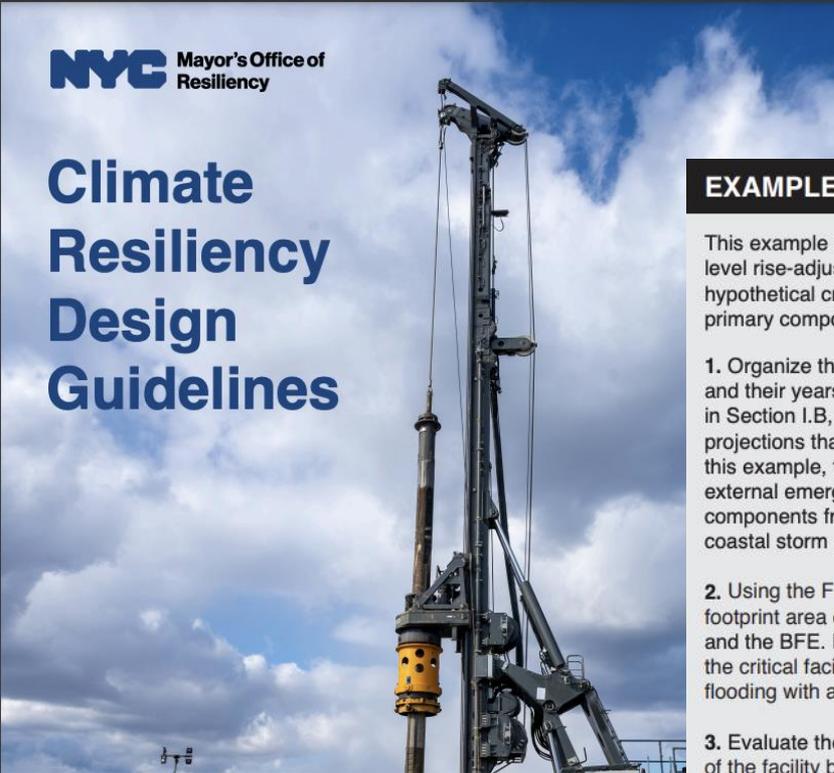




Buffers and Barriers



Climate Resiliency Design Guidelines



Design and Zoning

EXAMPLE: How to determine a sea level rise-adjusted DFE

This example illustrates how to calculate a sea level rise-adjusted DFE based on the useful life of a hypothetical critical services building and its primary components.

1. Organize the site by various primary components and their years of construction. Using Table 1 in Section I.B, determine the climate change projections that corresponds to useful life. In this example, the building structure and the external emergency generator are the most at-risk components from combined sea level rise and coastal storm surge.
2. Using the Flood Hazard Mapper, identify the site footprint area on the effective current floodplain map and the BFE. In this example, it was determined that the critical facility site has a 1% annual chance of flooding with a BFE of 13' NAVD.
3. Evaluate the criticality of each primary component of the facility based on the Guidelines' definition for critical infrastructure. This building and its emergency generator are both critical.
4. Table 5 demonstrates how to calculate freeboard requirements and the sea level rise adjustment for each component and calculate the sea level rise-adjusted DFE for each that corresponds to their useful lives.
5. Use the Guidelines' adjusted DFE for each component in the design of the facility.



Figure 10 - Example of how to locate a facility within the current floodplain and determine the BFE. Inset: outdoor elevated emergency generator at the facility elevated to a sea level rise-adjusted DFE specific to its useful life.

Table 5 – Example of a sea level rise-adjusted DFE for a new critical facility

Construction year	Components	Useful Life	Future Year Scenario [Useful Life + Const. Year]	BFE in NAVD 88 (feet)	Freeboard + Sea Level Rise Adjustment (feet)	Adjusted DFE in NAVD 88 (feet)
2010	Building Structure	70 years	2080s	13.0'	2' + 2'4"	17'4"
2010	Outdoor Emergency Generator	25 years	2020s	13.0'	2' + 6"	15'6"

**How we are working
together**

THE CONNECTING DELTA CITIES NETWORK



CDC RESOURCES



connecting delta cities
A C40 INITIATION

C40 CITIES
www.c40cities.org

Home
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New Orleans is the present-day test case for world delta cities

Resilient Cities and Climate Adaptation Strategies
C40 Book Volume 3
Available now. Download free of charge.

Latest news
17-05-2015
Rotterdam leader in water management

Water scarcity or a surplus of water: no one knows better than Rotterdam how to manage water. This port city ranks number one in the Sustainable... more

14-05-2015
Climate and water: New guidance & examples

Two major international networks recently published their on climate adaptation and water management. Here available online. more

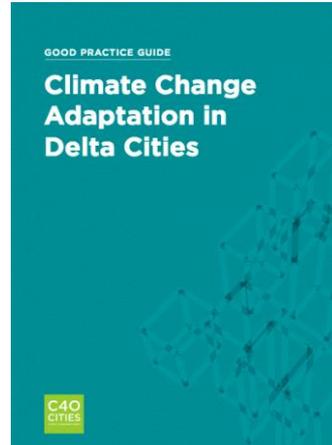
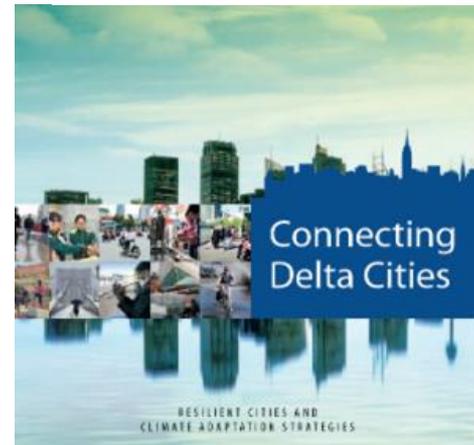
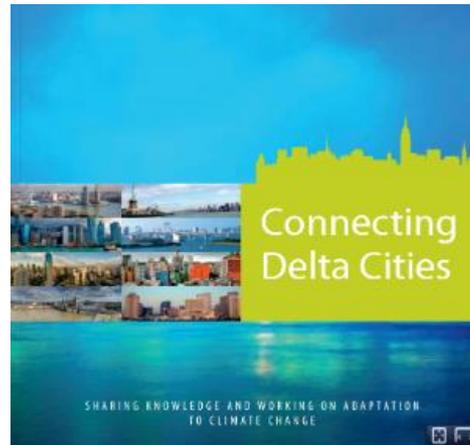
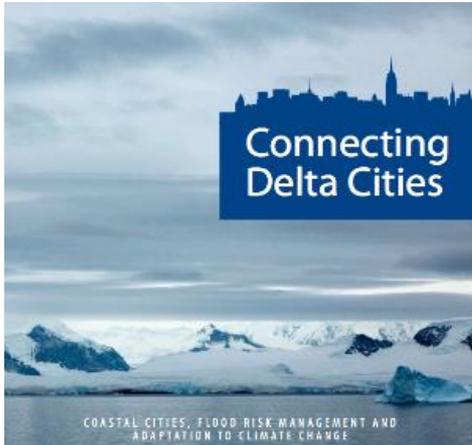
08-03-2015
For protection from the rising seas, look to Europe's example

Blog C40, RCI & Connecting Delta Cities
New York business trip after Sandy, blog entry by Arnold Muisser.
In October 2012 Superstorm Sandy made landfall in New York and New Jersey, causing widespread damage. The New York Mayor's Office has to deliver... Read the rest of this entry

Weblog: Georgia Rubenstein - Thursday March 14, 2015 Rotterdam - RCI
As we've traveled around the Netherlands over the past few days, we've seen countless examples of the Dutch innovating, managing, and... Read the rest of this entry

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Kenny Ultimate hasn't grabbed
Marion Fiedler @marionfiedler71
It's never a good thing if you have too much of one thing. It's Raining Now #Rooz #tweed youtube.com/watch?v=3j9P...
IT'S RAINING NOW
read more



CONNECTING DELTA CITIES WORKSHOP, VENICE 2018



“It is hard to imagine a better city and timing to hold a Connecting Delta Cities Workshop than late October in Venice. We could see the city’s long experience in dealing with extreme sea level being put to test, and also learn about further actions that are being implemented and planned to enhance the island’s resilience to an already observed increase in frequency and intensity of flooding.”– Felipe Mandarin, Rio de Janeiro

**“The visit of delegates from 10 cities coming from all over the world was an amazing opportunity to discuss climate change adaptation of coastal cities and we are very happy to be able to showcase the actions Venice is putting into practice to limit the impact of flooding, cloudbursts, heavy rainfall and tide surge. We have realized that from a technical point of view every city has its specializations but that the difficulties in delivering comprehensive climate change adaptation are the same at all latitudes. This encourages us and strengthens even more in the action, especially as we draw inspiration as we begin to draft the Venice Climate Action Plan to ensure that Venice is prepared for the future.”
– Massimiliano de Martin, Venice Deputy Mayor**

“Engaging with other global delta cities on the increasing risk of coastal flooding due to rising sea levels brought home to us the very real threats and challenges we face together,” said Phetmano Phannavong, DC Floodplain Manager at the District of Columbia Department of Energy and Environment. “Our continued cooperation will help Washington, DC adapt to climate change in innovative and vital ways.”

Learning with Venice

What Coastal Cities Learned from Venice

Design limitations of large tidal gates

Restoring local ecosystems (salt flats)

Sub-marine infrastructure (preparing for water resilience)

Public awareness systems

What Venice learned from other Coastal Cities

Governance leadership on long-term planning

Inter-agency mainstreaming to prepare for climate risk

Climate resiliency design guidelines

Nuances of managed retreat

Using maps and citizen science in community engagement

Reducing sediment loss in lagoon to offset sea-level rise





Thank you!

www.c40.org