

Smart Delta Cities

Deltas in Times of Climate Change
Session DP FR 4.1: Smart Flood Control in Deltas
Rotterdam, 30th September 2010



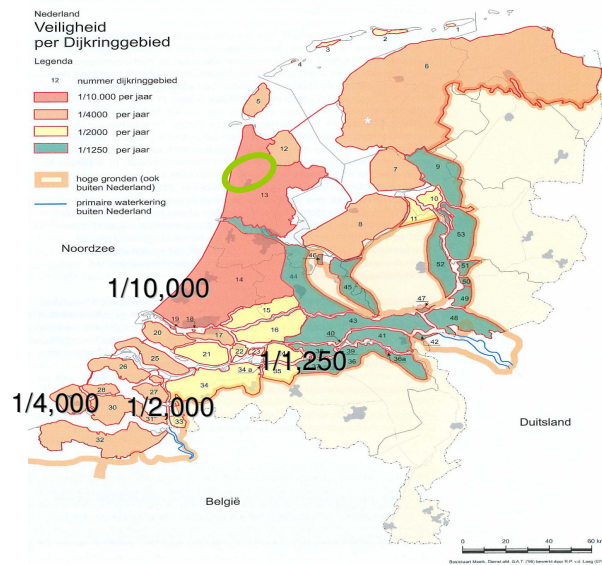
Piet Dircke, Director, Global Water Management ARCADIS
Professor Urban water, Rotterdam University
President, Flood Control 2015 Foundation

Imagine the result



2050: 70 % of world population lives in **Delta Cities**

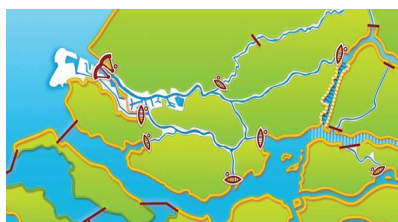
Smart Dutch National Flood Protection: Safety level per levee area (dike ring)



Imagine the result



Smart Flood Protection: Dutch Delta Plan(s) & Rotterdam Barrier(s)



Imagine the result





Smart solutions for Dutch Coastal resorts

Scheveningen

Reinforcement and Boulevard Development

- Boulevard design Morales
- Included within the existing infrastructure of Scheveningen.
- Complicated process due many interests in the coastal zone



Smart solutions for Dutch Coastal resorts

Noordwijk

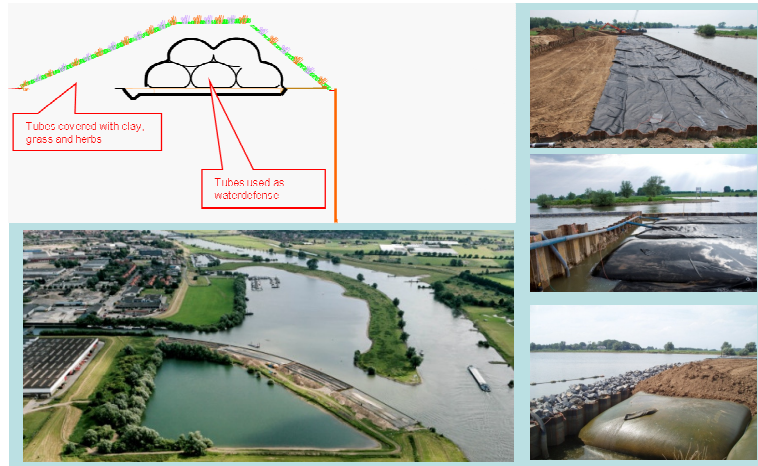
Wide but low dune reinforced by an invisible sea dike

- optimal design taking into account the safety requirements, the view at sea from the existing boulevard and the maintenance cost.



Flood defenses with smart use of local sediments

concept allows for the realization of flood defenses, using geotextile tubes filled with sediments as a sustainable building material



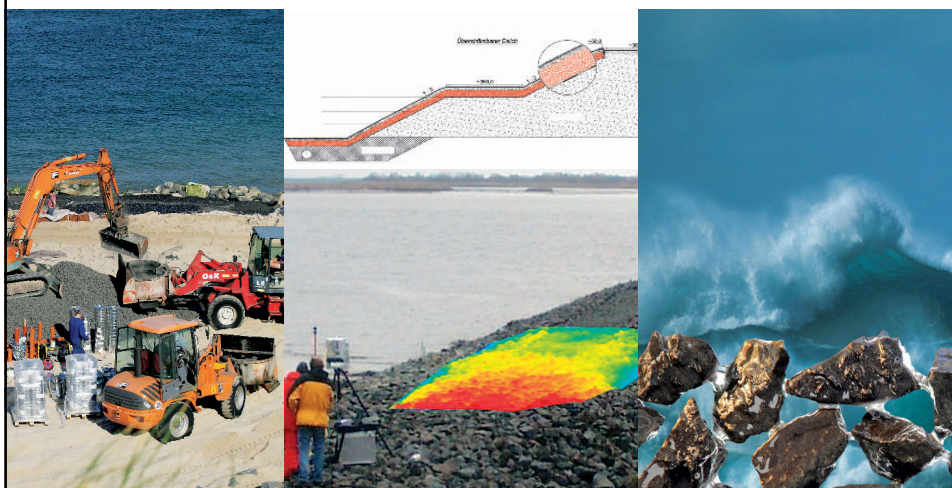
sustainable riverbank-recovery in Zutphen near river IJssel - 18.000 tons sediment, 450 meters

- cost effective flood defense • use of local materials • easy to construct • advanced application of sediments • cradle to cradle solution

Imagine the result



Innovations in smart materials: BASF elastocoast, wave & overtopping resistant



Imagine the result



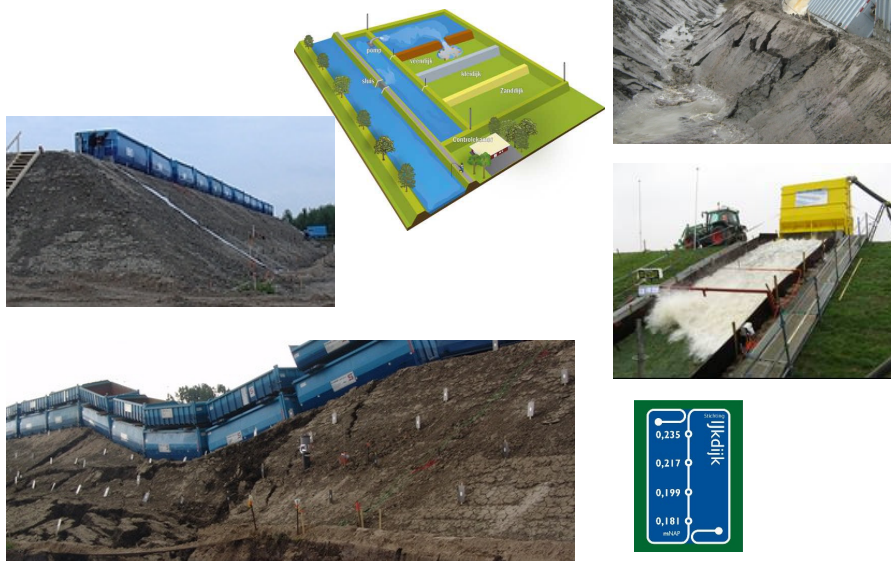
Smart multifunctional urban dikes



Imagine the result



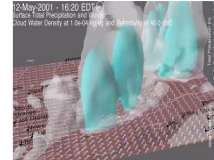
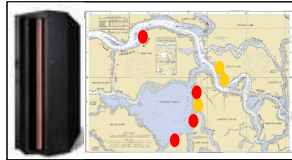
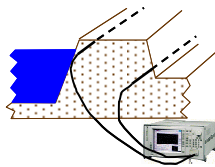
Smart levee testing facility



Imagine the result

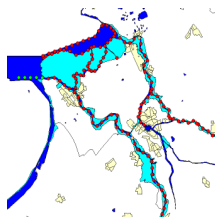


Flood Control 2015: Smart Integration of IT



Towards a smart flood control organization

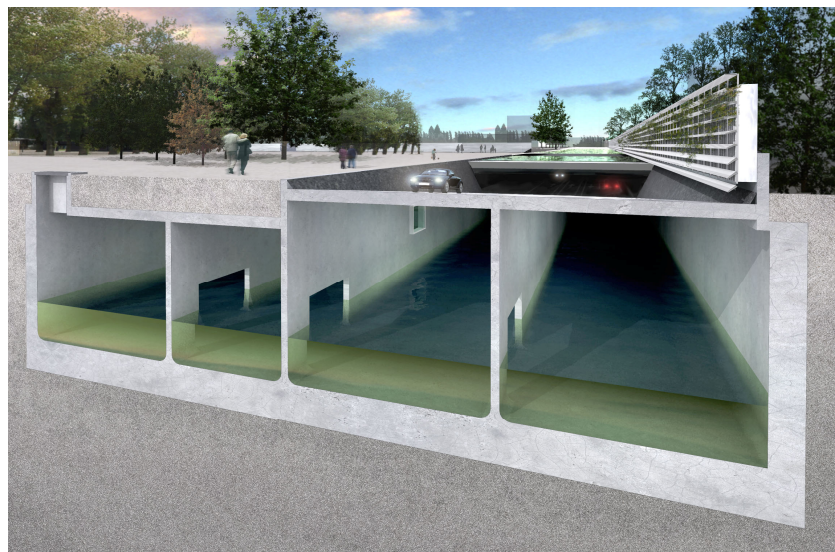
- Improve quality of decision making during emergencies
- Fast & real time prediction of calculated risks



Imagine the result



Smart water storage in parking garages

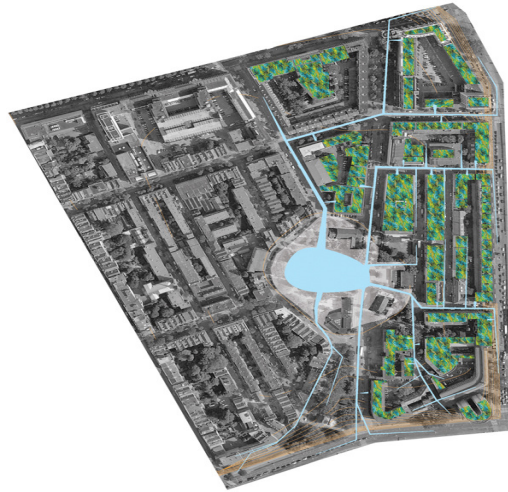


Imagine the result

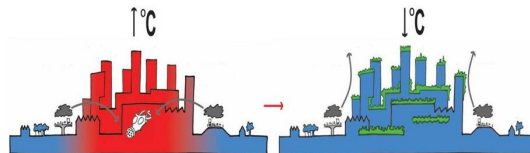




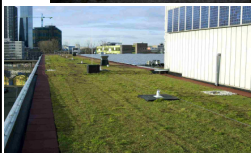
Also smart: Water Plazas



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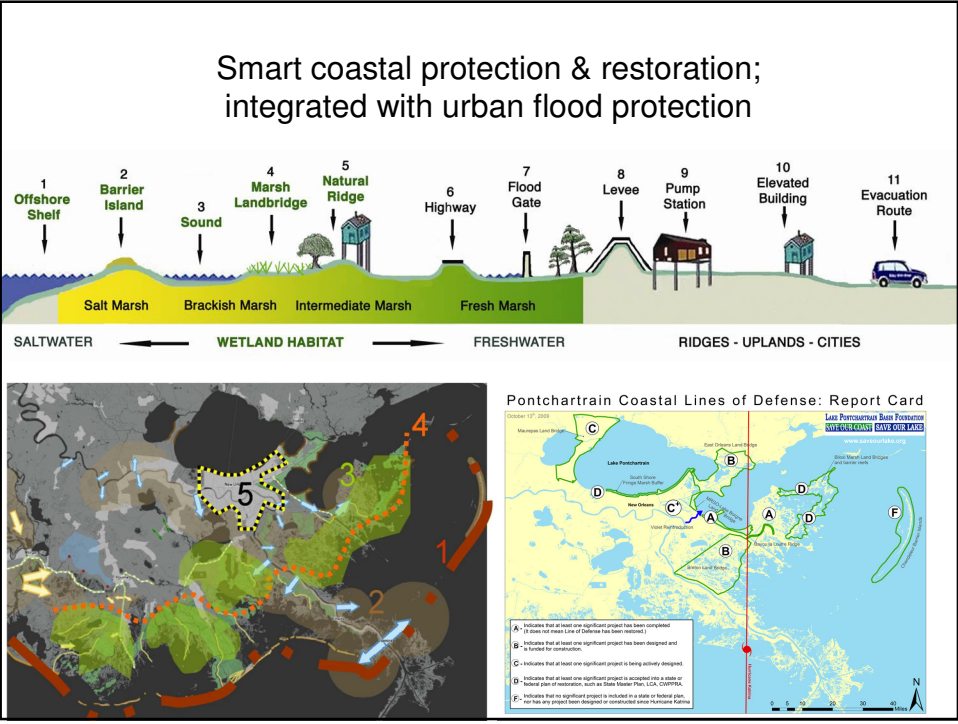


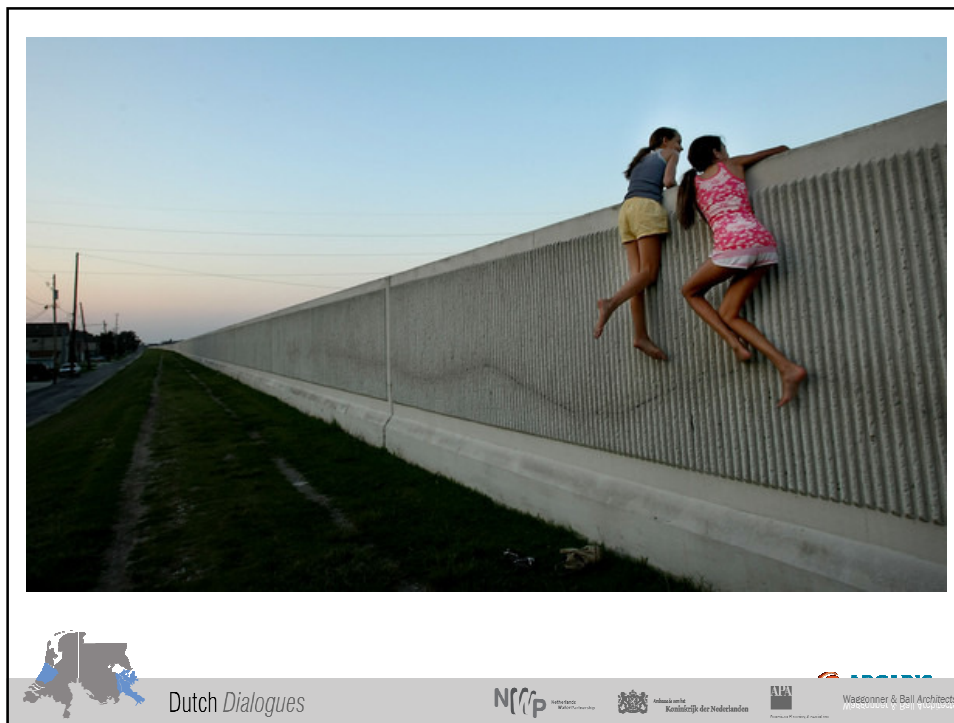
Smart: Green Roofs



Imagine the result

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Delta Urbanism: Smart integration of urban planning, architecture, landscaping, ecology in urban water management; **Dutch Dialogues**

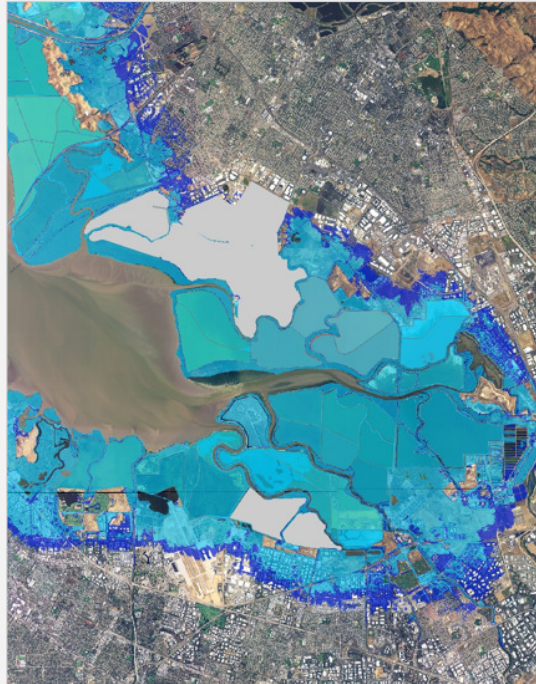


Imagine the result

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Smart climate adaptation: Silicon Valley

 Sixteen Inch Sea Level Rise
and
 Fifty-five Inch Sea Level Rise



Smart climate adaptation: Silicon Valley

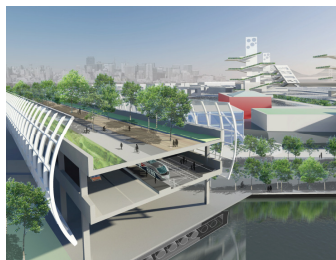
 



Smart climate adaptation: Silicon Valley



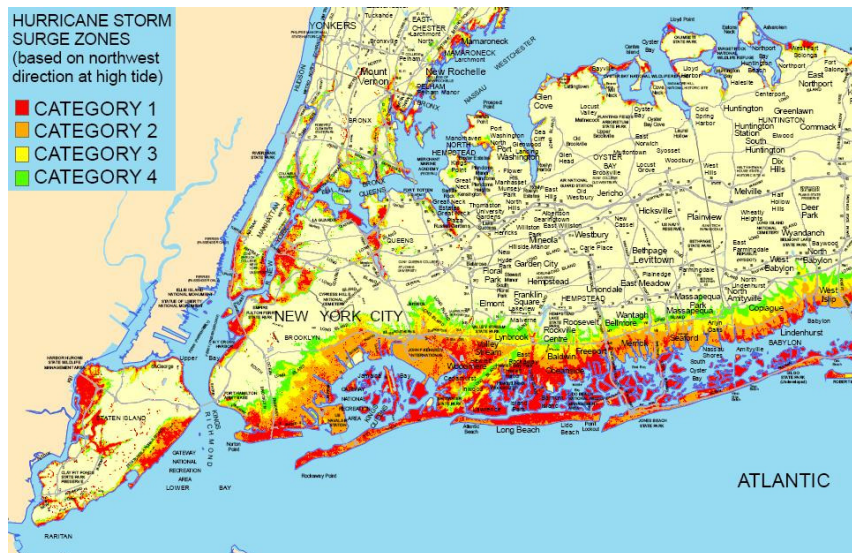
San Francisco Bay BCDC Smart climate change adaptation strategy



Imagine the result

Potential measures			
Name	Description	Priority	Typology
1. Coastal protection and restoration	1.1. Coastal protection and restoration	High	Coastal protection and restoration
2. Coastal protection and restoration	2.1. Coastal protection and restoration	High	Coastal protection and restoration
3. Coastal protection and restoration	3.1. Coastal protection and restoration	High	Coastal protection and restoration
4. Coastal protection and restoration	4.1. Coastal protection and restoration	High	Coastal protection and restoration
5. Coastal protection and restoration	5.1. Coastal protection and restoration	High	Coastal protection and restoration
6. Coastal protection and restoration	6.1. Coastal protection and restoration	High	Coastal protection and restoration
7. Coastal protection and restoration	7.1. Coastal protection and restoration	High	Coastal protection and restoration
8. Coastal protection and restoration	8.1. Coastal protection and restoration	High	Coastal protection and restoration
9. Coastal protection and restoration	9.1. Coastal protection and restoration	High	Coastal protection and restoration
10. Coastal protection and restoration	10.1. Coastal protection and restoration	High	Coastal protection and restoration

Potential measures		Typologies				
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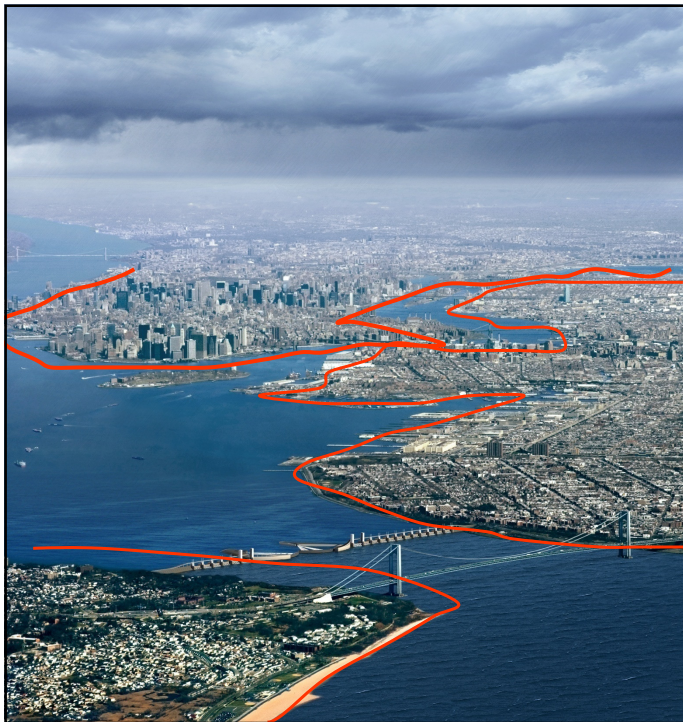
Imagine the result



Verrazano Narrows Barrier Artist impression



Imagine the result



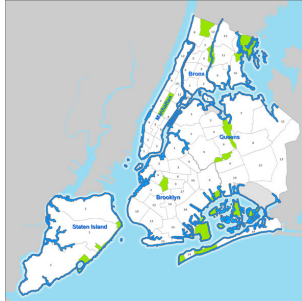
Smart alternative :

**Sustainable
robust
Climate
Proof
Waterfronts**

**Resilient
communities**



Climate Robust Waterfronts

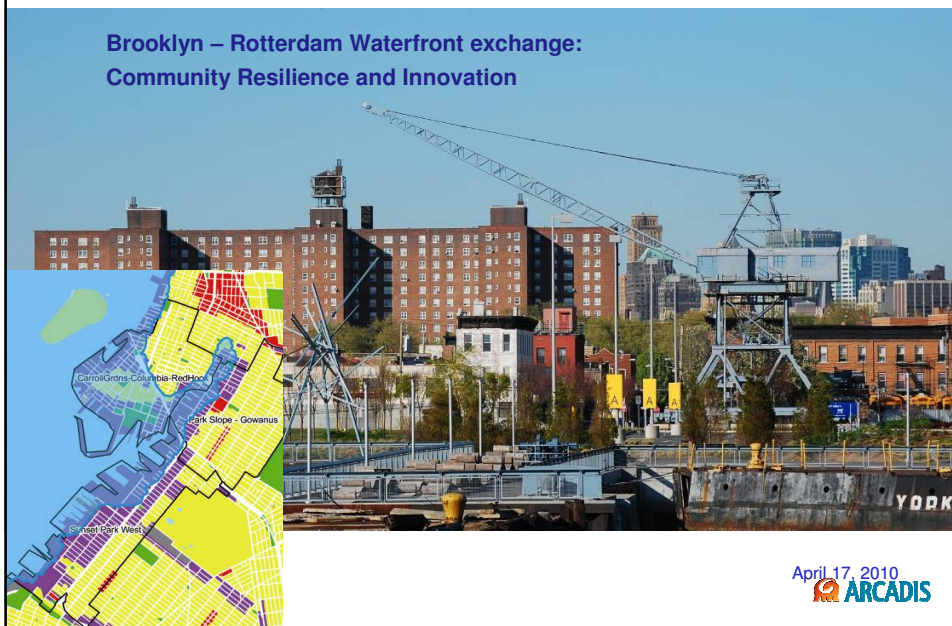


turning the threat into an opportunity



Imagine the result

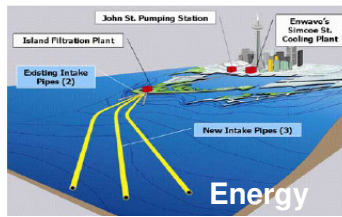
Brooklyn – Rotterdam Waterfront exchange: Community Resilience and Innovation



April 17, 2010
 ARCADIS



Resilient Communities



Energy



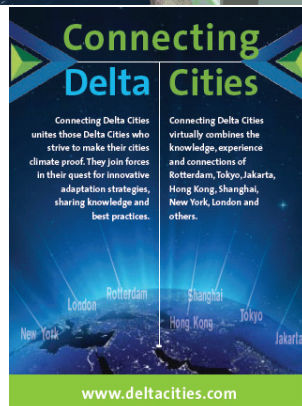
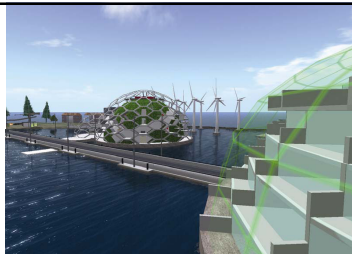
Imagine the result

ARCADIS

RDM Campus Rotterdam: Research, Design & Manufacturing



Imagine the result



Gemeente Rotterdam

Smart Climate Adaptation & Knowledge development



Smart Knowledge Networks: Connecting Delta Cities

Jakarta



New York



Shanghai



Memorandum

Hudson 400 H2O9

World Expo



**CLINTON
CLIMATE
INITIATIVE**



Rotterdam NWC national water Center



Imagine the result



Rotterdam NWC national water Center



Imagine the result



**Next step: smart solutions
Smart flood control & smart energy ??**



Thank you!!

