



### Making Progress in the Urban Water Sector

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## the challenges

## Our 19th century approaches have not worked well in many countries





## ~780 million without access to improved water

~2.5 Billion without access to improved sanitation

Linear, single quality, use once and throw away 'All or nothing' - unaffordable for 2/3 of planet

### 85% of wastewater is <u>NOT</u> treated



## Having treatment plants doesn't mean they work and do their job!



### What happens when the pit is full?

6.2.1 – safe managed sanitation https://www.flickr.com/photos/sharadaprasad/

## Global change pressures will make things even more difficult









## **Opportunity to do things differently**



Source: World Bank (2010) World Development Report 2009 Reshaping Economic Geography, second edition, pp. 35



## status quo not an option

We require a level of leadership and innovation unprecedented in our history

complexity in transitioning to integrated one water solutions

deep uncertainty associated with global change pressures

### We live in the 'now'

Decisions need to be made today about our aging & outdated infrastructure

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We require a level of leadership and innovation unprecedented in our history

### complexity in transitioning to integrate complexity in transitioning to integrated one water solutions deep uncertainty associated with global change pressures

## productive use of water

## Changing our perspective creates opportunity to do things differently



#### **Durban Water Recycling**









Tertiary: Irrigation



#### Nitrified: Cooling



RO(x2): Refinery



2nd+RO+MF: AAR



RO: Refinery



## We need to have a systems perspective of the water cycle



## Modelling allows us to connect all flows with productive uses

SURFACE WATER/GROUNDWATER/DESALINATION)



### At watershed level also 'system of systems'



## waste as a resource

## Changing our perspective creates opportunity to do things differently



## Maximizing the recovery of resources













As-Samra, Jordon

### Important to understand the business model



## Small scale nutrient recovery, Durban

### Fecal sludge into safe fertilizer: LaDePa machine





### Important to understand the business model



## We're starting to talk about machines and factories



### April 2014: Semizentralized **Resource Recovery Center Qingdao Shiyuan**





Greywater Treatment Blackwater Treatment Foodwaste pre-treatment Energy-Center

## These perspectives lead to a more distributed type of thinking?

### **Distributed systems well suited for:**

- Energy recovery (heat recovered and used close to source)
- Minimizing energy consumption (for moving water)
- Source separation (to maximize nutrient recovery)
- Adjusted growth (to deal with rapid growing cities)
- Increased resiliency (dampens the propagation of failures)



## We need adaptive/flexible smart systems for an uncertain world



## **Getting of the grid – disruptive**



We require a level of leadership and innovation unprecedented in our history

 

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## Water utilities are conservative and resistant to change – Yes but for rational reasons

- Risk averse due to public health concerns
- Tight budgets that must be spent carefully
- Many upfront costs to procuring innovation
- New approaches need newly trained staff

### **Spreading innovation takes time**



Gossett, I.M., McCarty, P.I. (1978)

Source: Cambi

## Myth - water sector slow moving & presents few opportunities to introduce major innovations

Gestation Period (Average)





### Need to think of horizontal technologies and then manage them appropriately





### DC Water's Innovation Focus: Intensification and Resource Recovery

### **Bridging science to practice**



## R&D & innovative technology providers

### Bridging the chasm

### **Water Utilities**



### **IWA Specialist Groups can be a catalyst**



Water sector self-hypnotizes itself to change through dialogue and data

## **Principles for water wise cities**

The IWA **Principles** for Water Vise Cities

For Urban Stakeholders to Develop a Shared Vision and Act towards Sustainable Urban Water in Resilient and Liveable Cities



the international 17 Pri water association

Regenerative Water Services
• Replenish Waterbodies and their Ecosystems **Regenerative Water Services**• Increase the Modularity of Systems and Ensure Multiple Options

Water Sensitive Urban Design
 Enable Regenerative Water

Water Sensitive Urban Design

Materials to Minimise Environmental Impact

Cities & Watershed Stewardship

Prepare for Extreme Events

4 Water Wise Communities • Empowered Citizens Water Wise Communities • Leaders that Engage and

Engender Trust

### WHY CITIES ENDORSE?



### WHY CITIES ENDORSE?

### MOBILISE

Rally urban stakeholders around a shared vision

### LEARN

Be part of a network to exchange lessons learned

#### SHARE

Show the rest of world the things they do well

### WHY PROFESSIONALS ENDORSE?

### CHAMPION

Rally urban stakeholders around a shared vision

### BE AGENTS OF CHANGE

Accelerate the transition, through their work

LEARN

Be part of a network to exchange lessons learned

#### SHARE

Contribute lessons learned to the IWA Network

### **NEXT STEPS?**

- Foster Knowledge Exchange
  - Use the Principles to mainstream a "City Water Language" in partnership with global and regional City Networks
  - Develop intelligence on actions/ solutions by and for cities structured around the Principles
- Activate Actors of Change
  - Further develop partnerships with IWA members to be champions who accelerate the transition to water-wise cities by influencing actors of change
  - Support IWA members in their implementation of innovative solutions to address their water challenges

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www.iwa-network.org

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### **CITY WATER STORIES**



#### Amsterdam

Netherlands



Brisbane

Australia



#### Copenhagen

Denmark



Dakar

Senegal



Gothenburg

Sweden



#### Kampala

Uganda





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IWA-Connect Group: Cities of the Future

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