



International Knowledge Sharing in a Complex and Rapidly Changing World

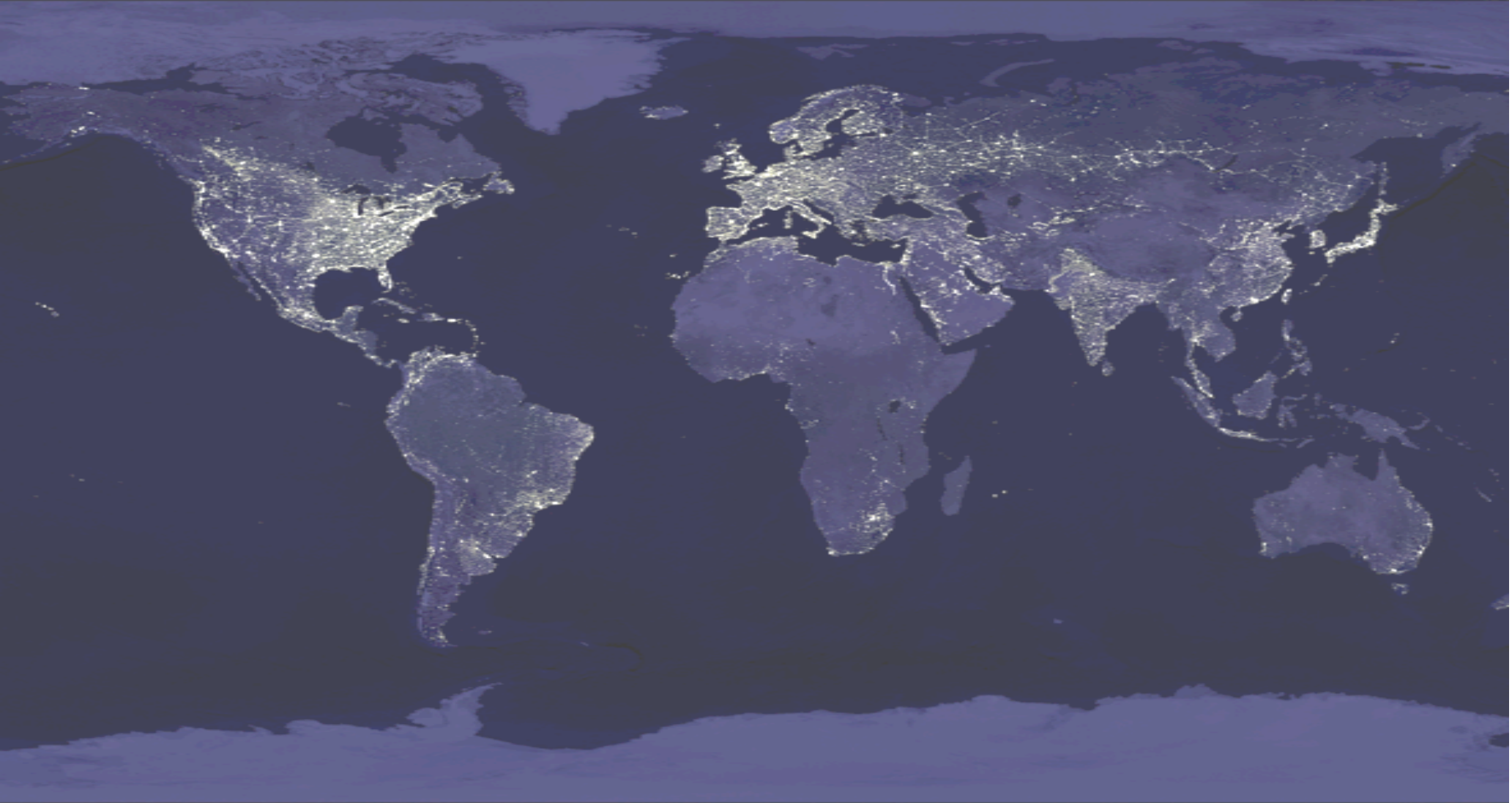
**AMWA 2012 Annual Meeting
Portland 22 October, 2012**

***Paul Reiter
Executive Director
International Water Association***



**International
Water Association**

Hot, Flat and Crowded with Two Billion Yet to Add --



The Urban Arithmetic for 2050

- 155,000 persons per day
- 90% in developing countries
- ~90% in urban areas

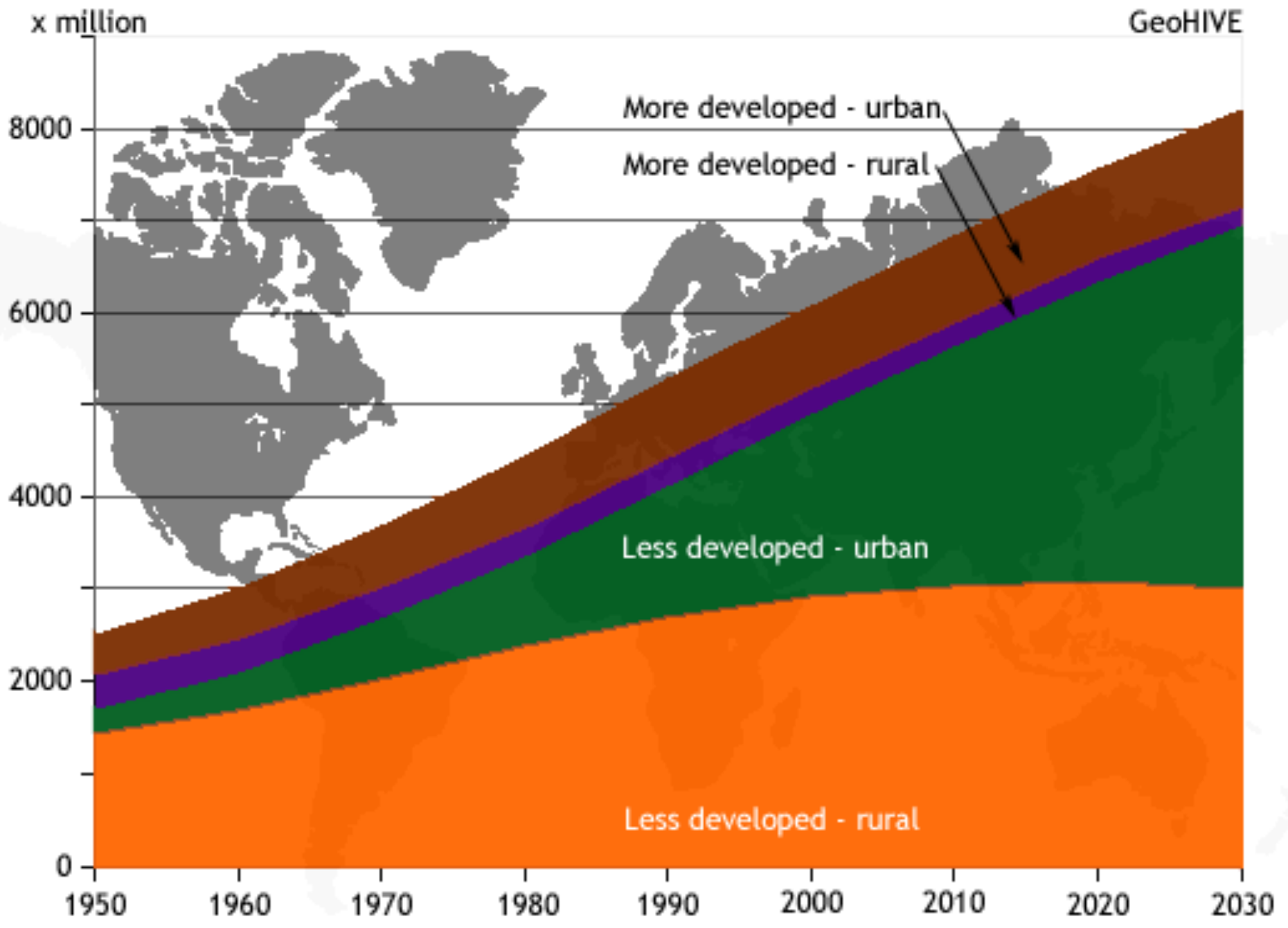
- ~800,000 per week in urban settings
- X 52 weeks per year
- X 40 years





Doing More with Less

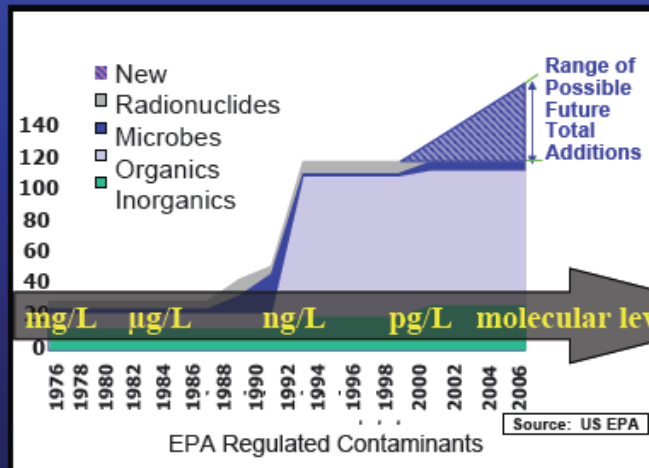




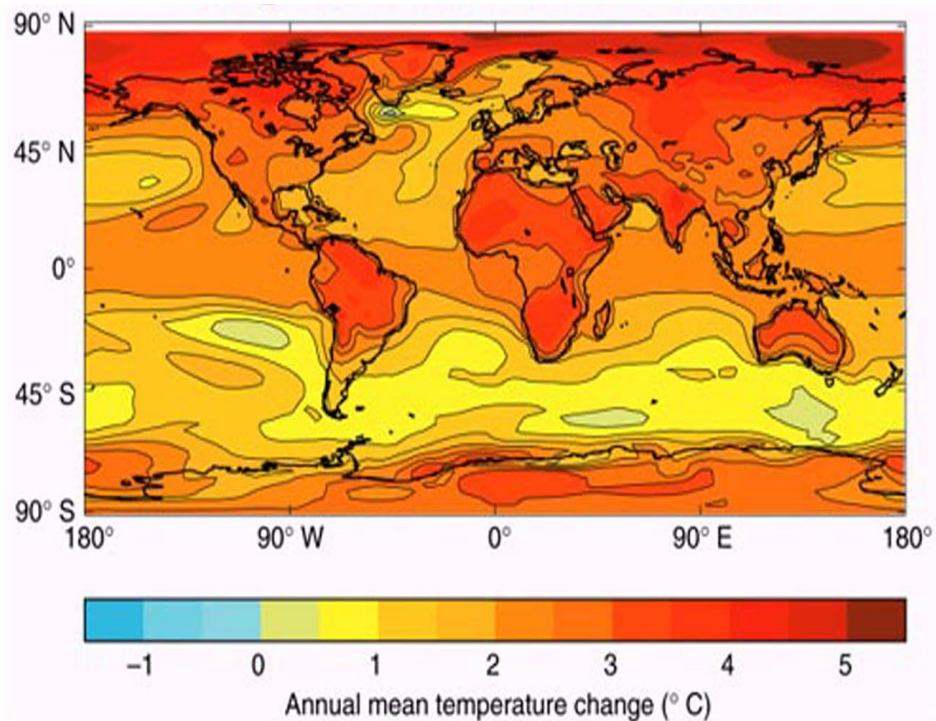
Urban/rural population for less and more developed regions



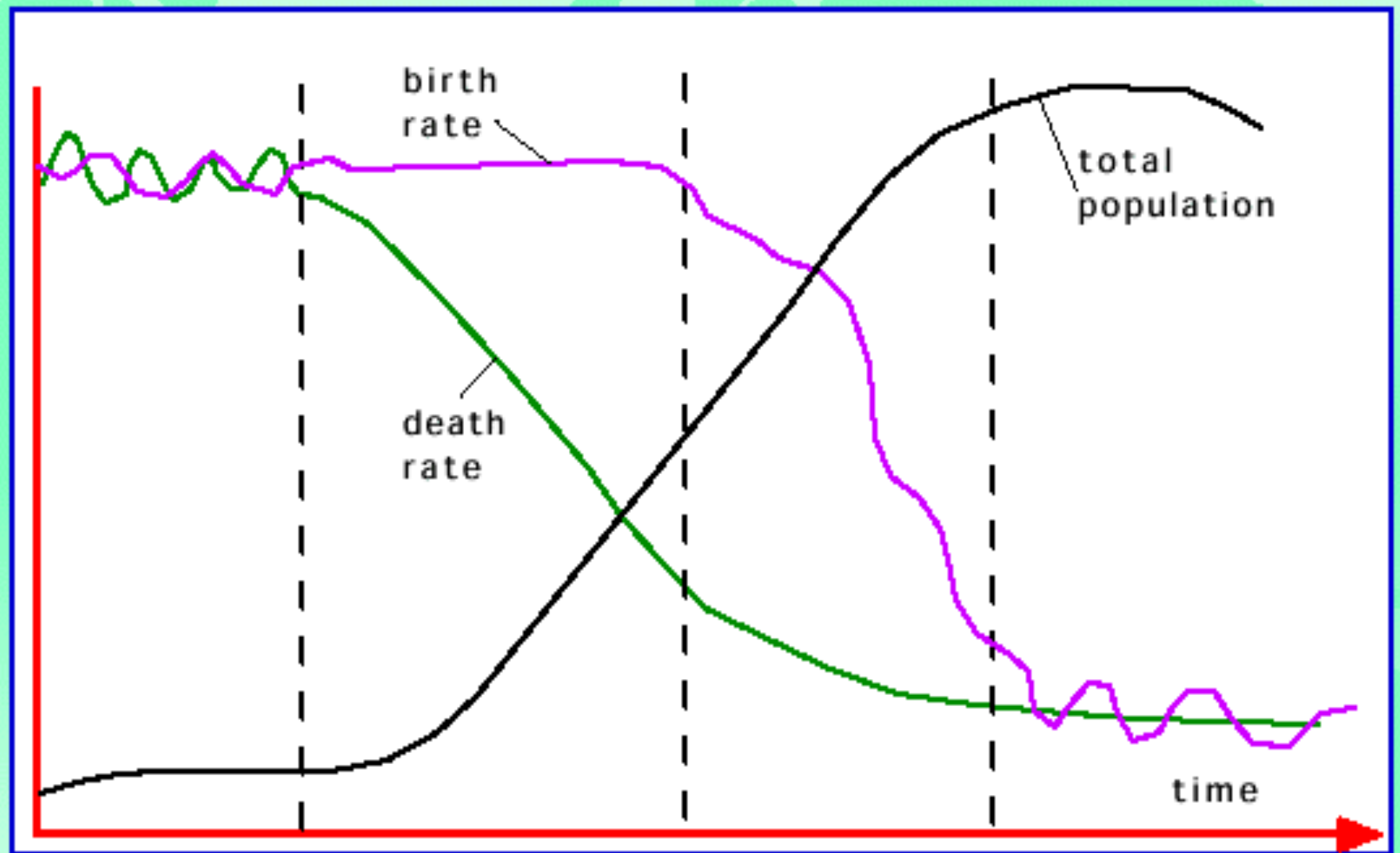
Technology: Drinking Water Regs



- Stage 2 DBPR
- LT2ESWTR
- Distribution Rule?
- On-line Monitoring



The Demographic Transition



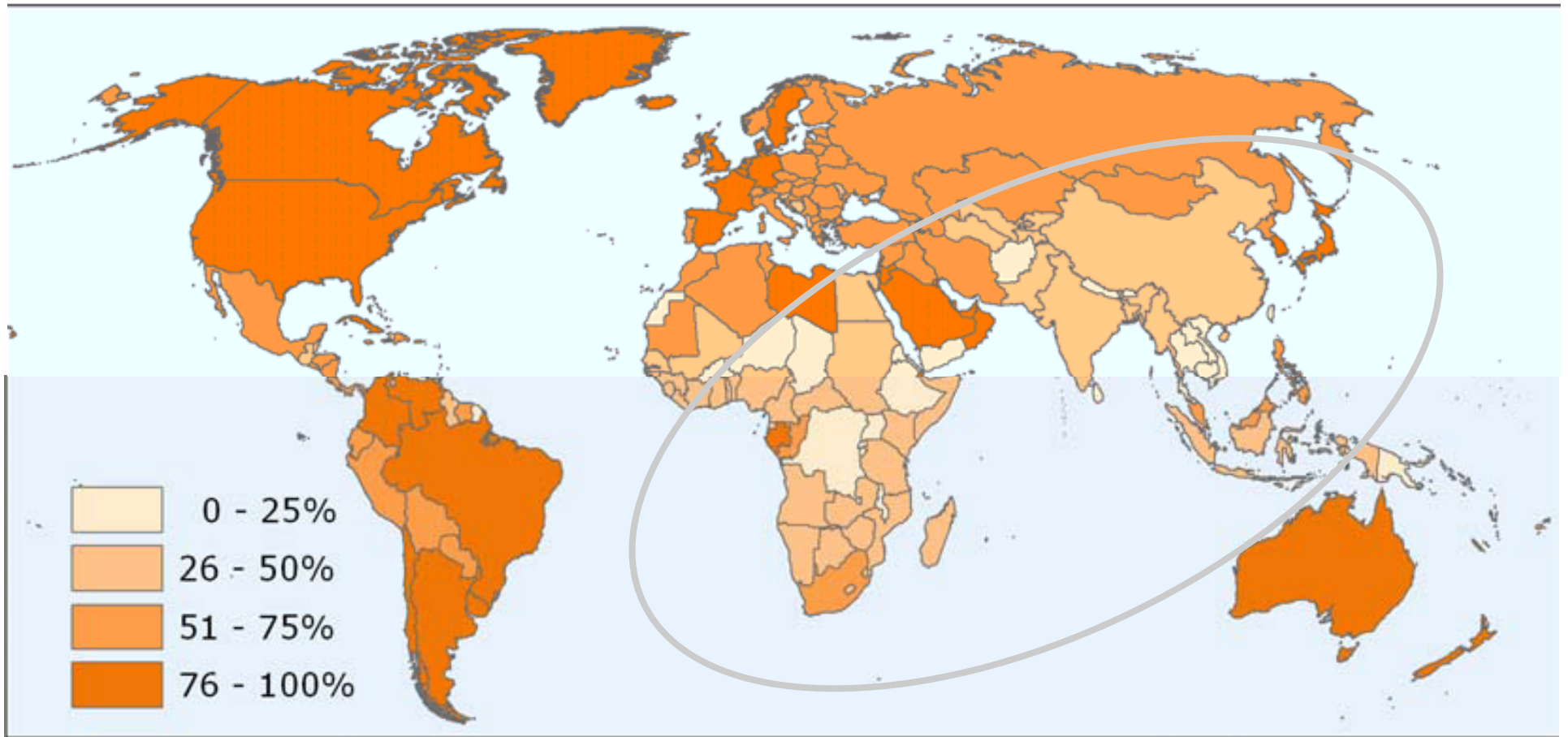
Stage 1
High birth rate
high, but fluctuating
death rate

Stage 2
Declining death rates
and continuing high
birth rates

Stage 3
Declining birth
and death rates

Stage 4
Low death rates
and low, but
fluctuating birth rates

Urbanization Differences 2004





Masindi

Urban Sanitation is Our Biggest Challenge in the Next Decade



~3 Billion without water at home or in the vicinity (45%)

~4 Billion without continuous access to water (60%)

~4.5 Billion with no sewerage (70%)

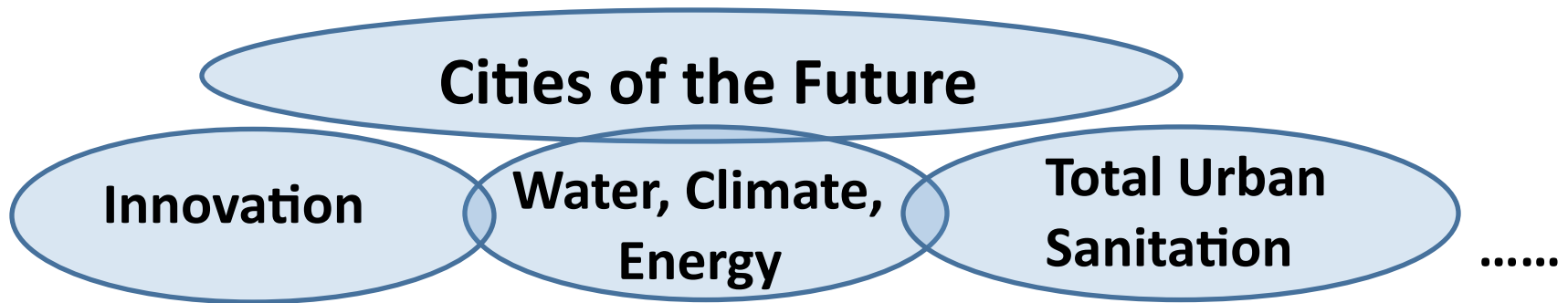
~5.5 Billion with no treatment (80%)



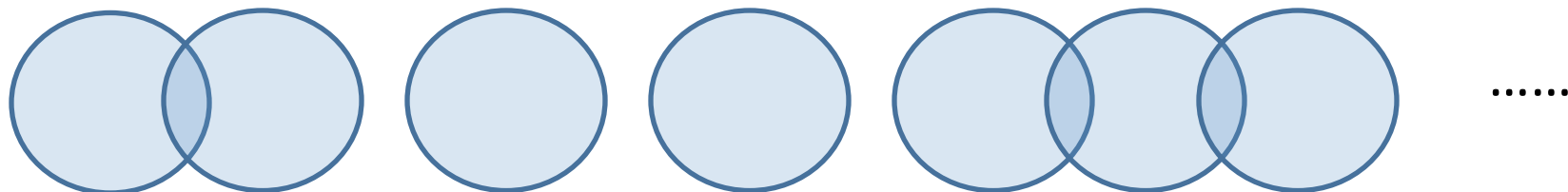


Topical Programs, Clusters & Specialist Groups

Cornerstone Topical Programs



Specialist Groups (50+)



Cities of the Future

building strategies to advance urban water security



International
Water Association

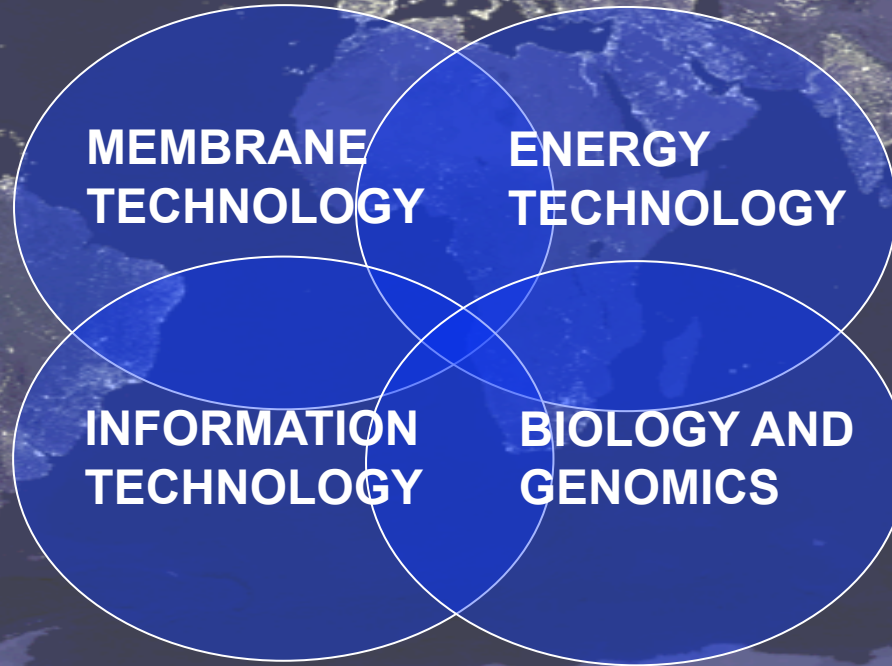
The IWA Cities of the Future programme focuses on water security for the world's cities and how the design of cities – and the water management, treatment and delivery systems that serve them – could be harmonised and re-engineered to minimise the use of scarce natural resources and increase the coverage of water and sanitation in lower and middle income countries.

The combined effects of unabated population growth, rising incomes, urbanisation and climate change have set the stage for the challenge of the 21st century – providing food, water and energy for rapidly growing planet. Against these increasing requirements for managing water is the reality that new supplies from traditional ground and surface water sources are difficult and in some cases impossible to derive. Increasing extreme weather events such as storms will stress urban water management systems. Competition for water between agriculture, industry, energy and cities

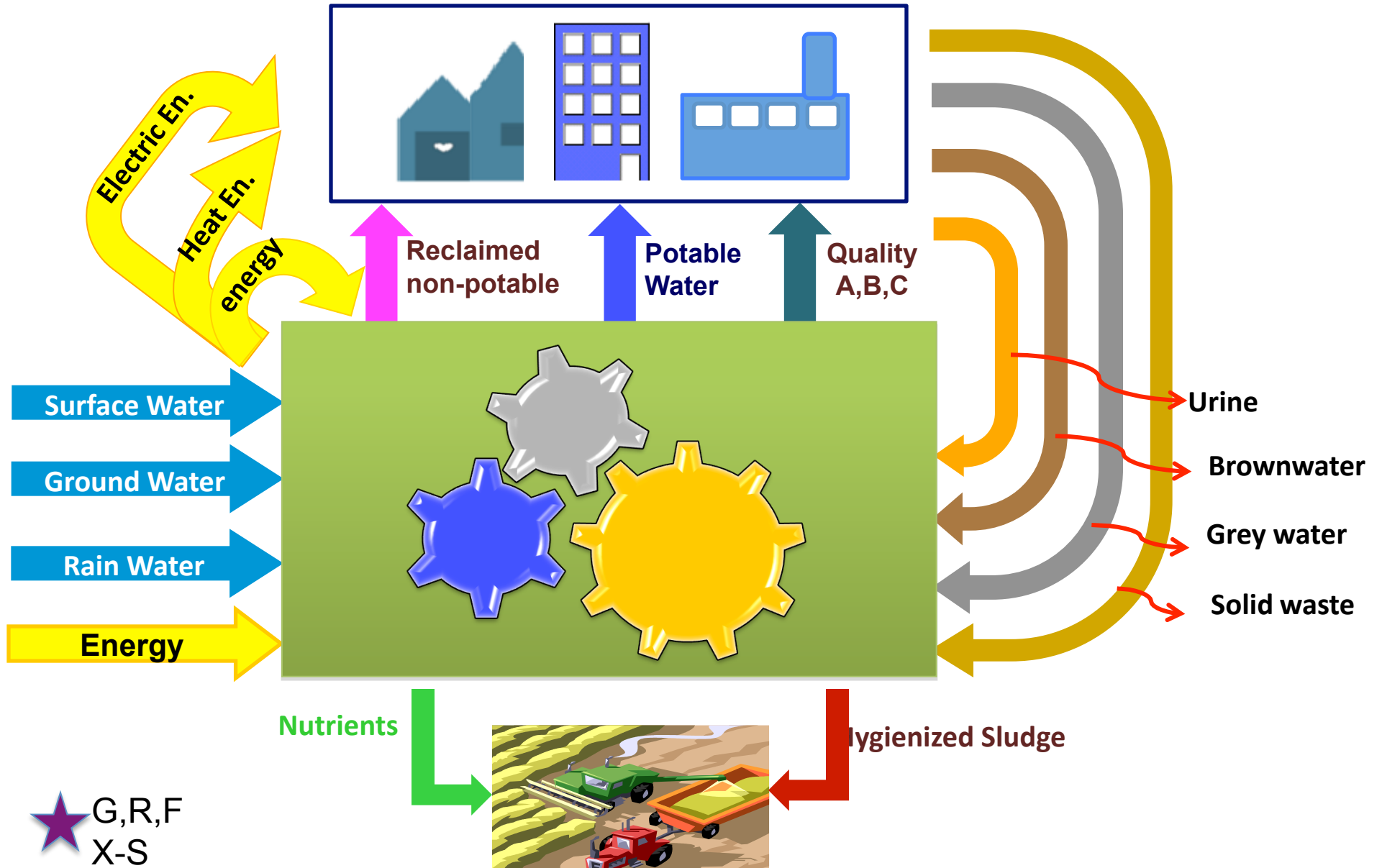


How Will Cities of the Future Need to Evolve to Meet These Emerging Challenges?

Hot, Flat and Crowded but with a Revolution in the Making --



The Water Machine





New Water Cluster – Which Groups Involved?

- Efficient (Conservation)
- Water loss
- Reuse
- Desalination (new)
- Membrane
- Rainwater Harvesting
- Urban Drainage
- Ground Water (kind of new)





Phase One -- Planned Activities of the Smart Water Cluster

- Planning methodologies for combining, costing and valuing portfolios (economic)
- Modelling tool development for real time portfolio management (hydraulics, storage)
- Operational methodologies for blending diverse sources (chemistry, networks, wq)
- Communication strategies for adding non-traditional sources into portfolios
- Global campaign to develop and get adopted a new vernacular for water treatment and sources





Solid Waste Plant

Power Plant

CITY A ----BEFORE

Waste Water TP

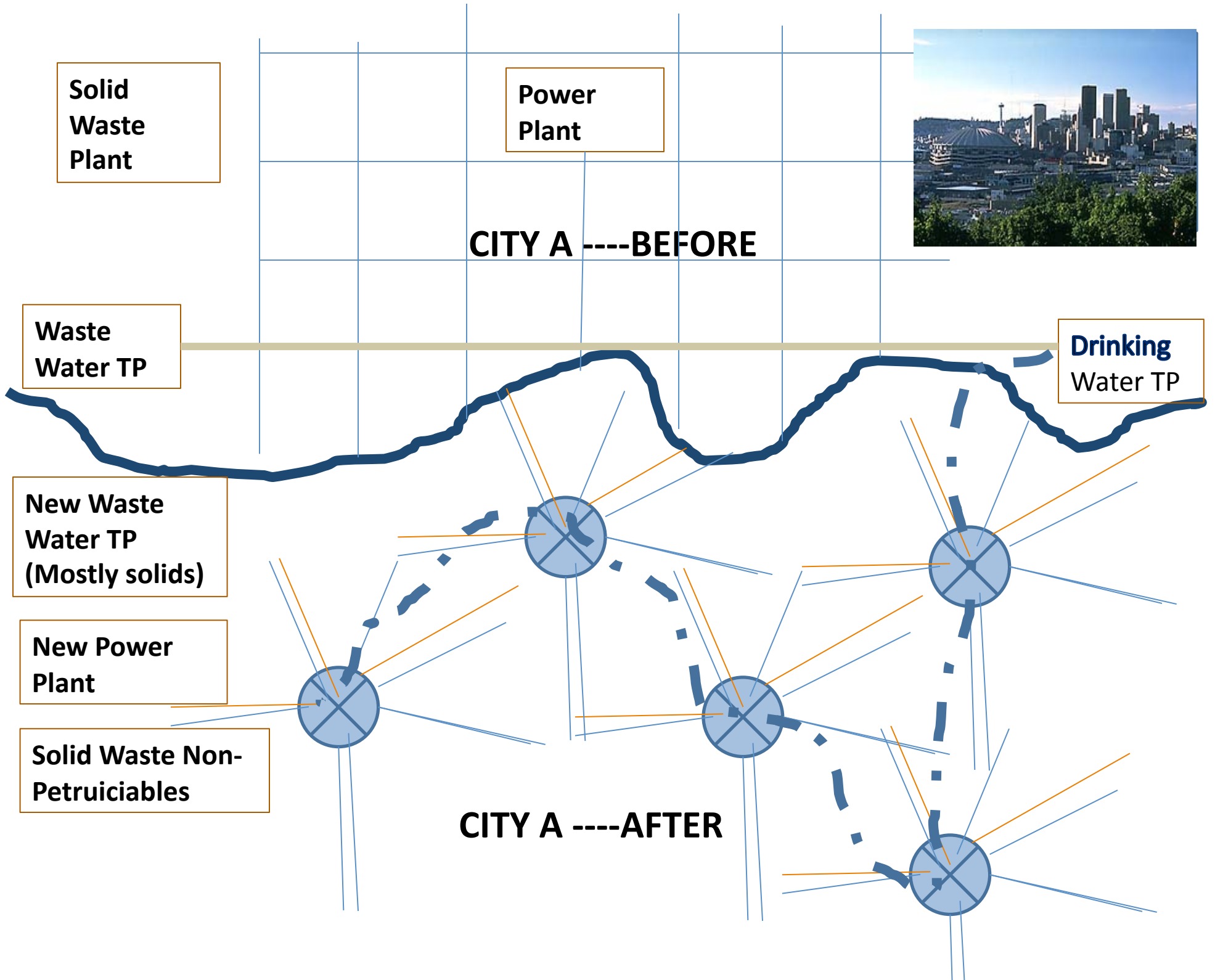
Drinking Water TP

New Waste Water TP (Mostly solids)

New Power Plant

Solid Waste Non-Petruiciables

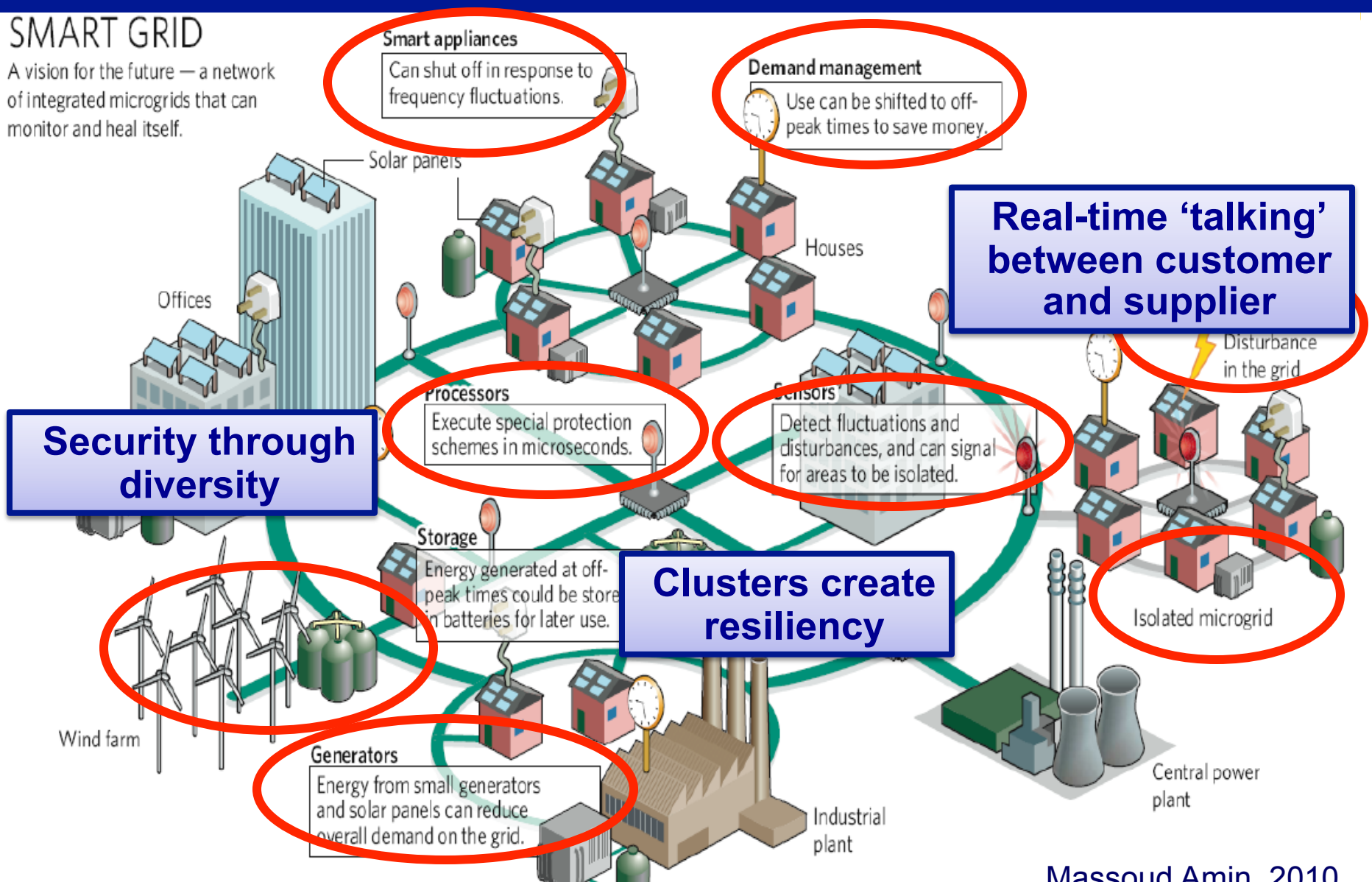
CITY A ----AFTER



Water can learn from the power sector

SMART GRID

A vision for the future — a network of integrated microgrids that can monitor and heal itself.



Networks of the future will have lives of their own

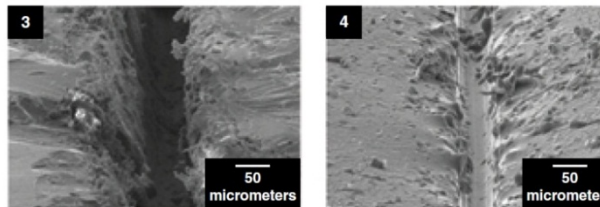
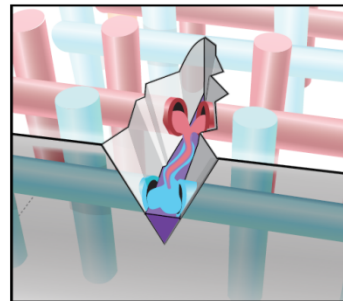
Smart Pipes

- Nano scale sensors embedded into pipes during manufacturing.
- Sensors monitor data on hydraulic, material, and environmental
- Sensors provide geo-referenced data points



Self Healing

- Various strategies: *capsule*, *vascular*, *intrinsic*
- Pipes store healing agents and polymerizers that solidify when mixed
- Healing efficiencies 100%
- Recovery strength >100%



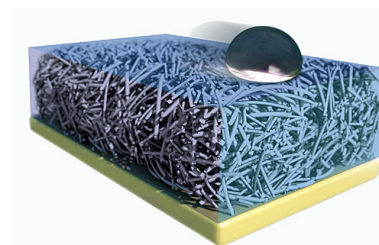
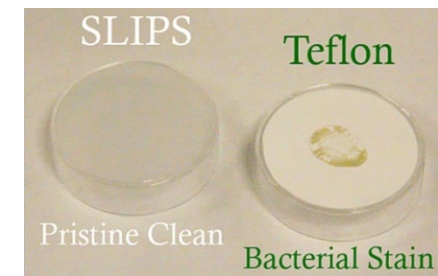
Corrosion formation

Corrosion Repair

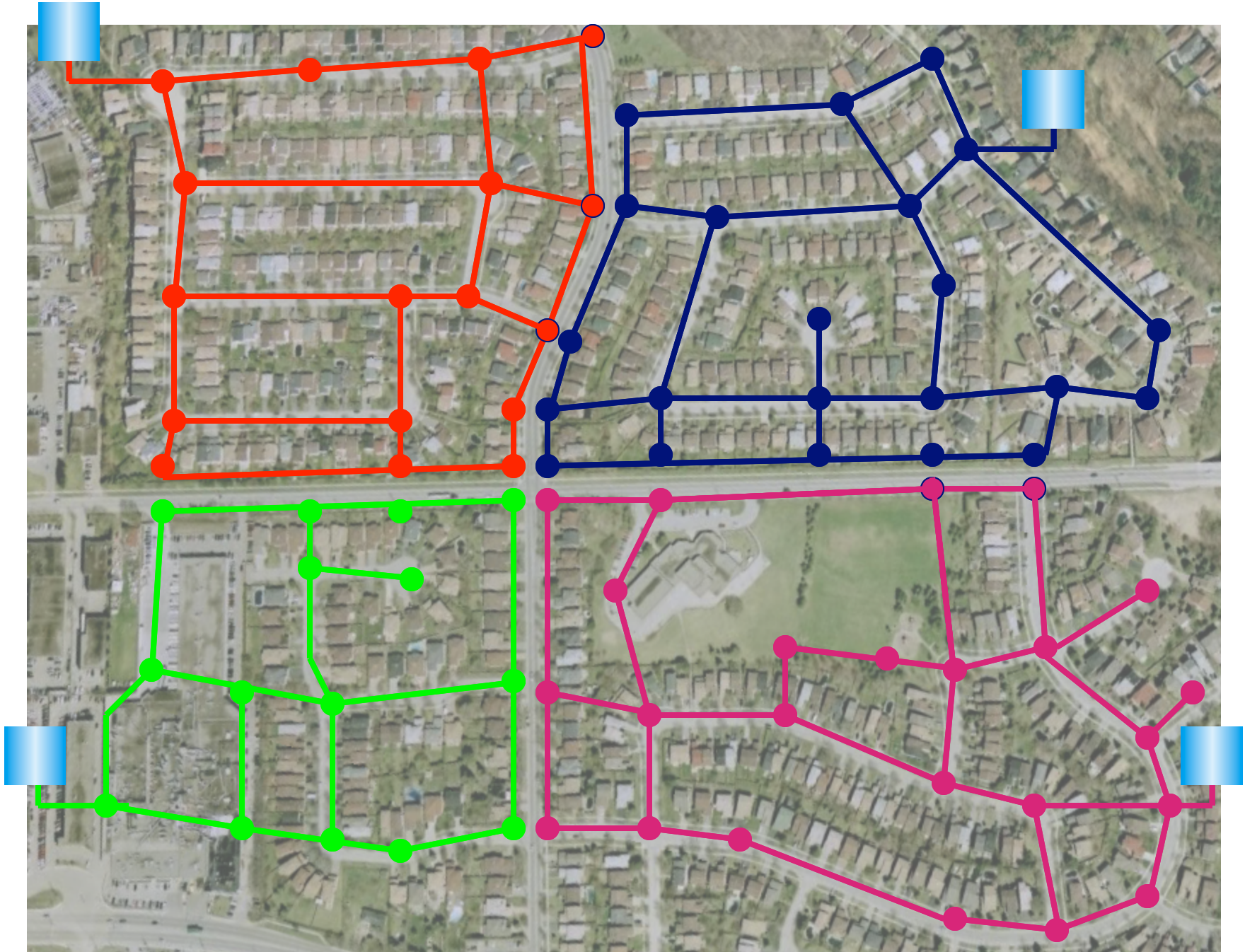
White et al. 2011

Frictionless

- Slippery Liquid-Infused Porous Surfaces (SLIPS)
- Super-thin Nano-substrates infused with a liquid lubricant creates a smooth surface
- Reduced biofilm formation by 96-99%

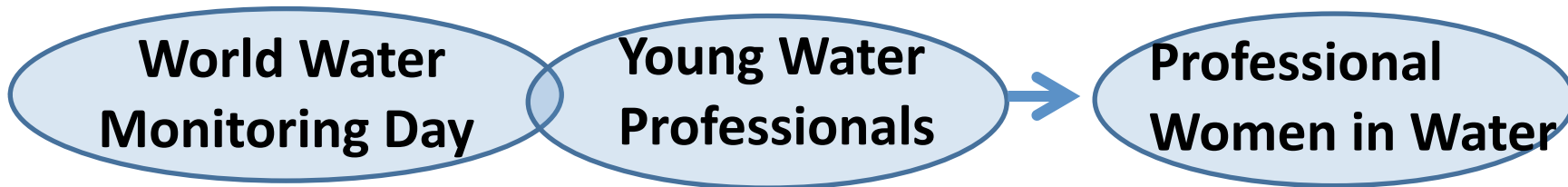


Epstein et al. 2012



Member & Organizationally-Oriented Programs

Cohort Focused:



Utility Focused:

Water Utilities Leaders Forum & National Partnerships -- AMWA

Water Operators Partnerships

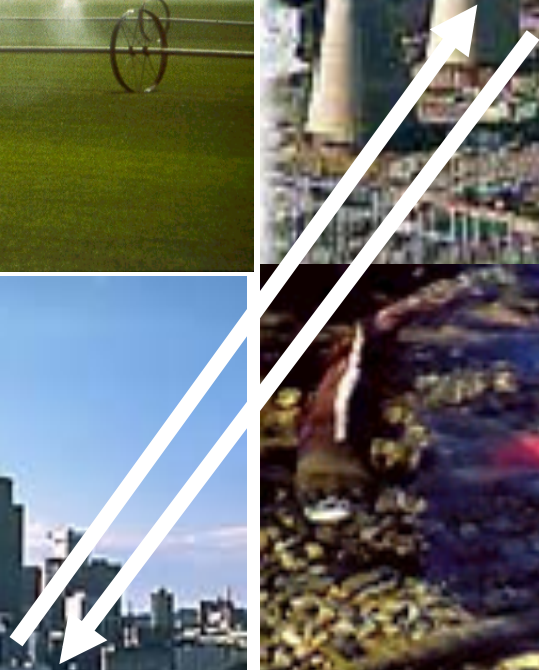
Water Safety Plan Network

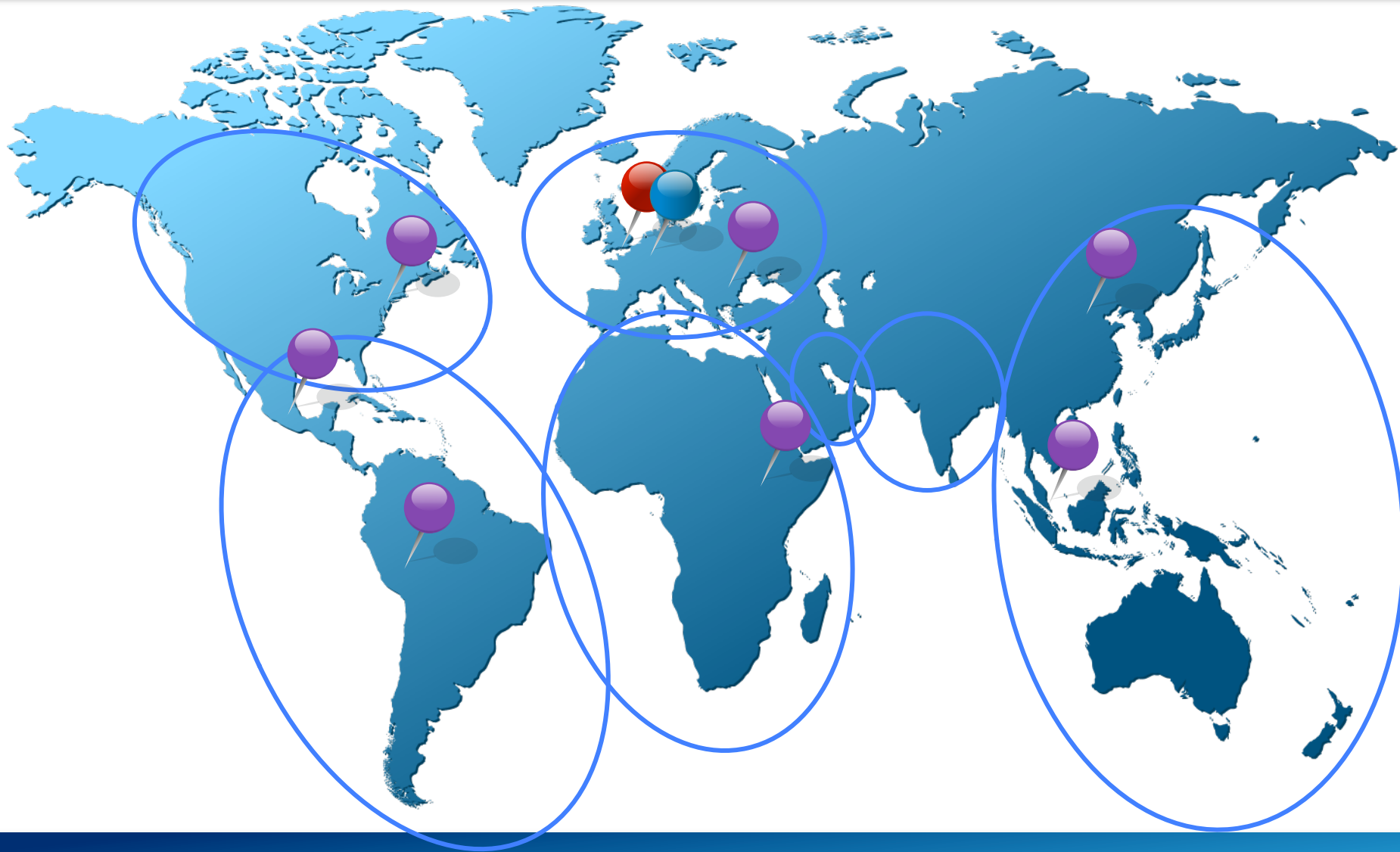
Research Focused

Bi-Lateral Relationships w/Leading Research Orgs Worldwide

EU Water Supply & Sanitation Technology Platform + EU Innovation Partnership

Global Water Research Coalition (GWRC)



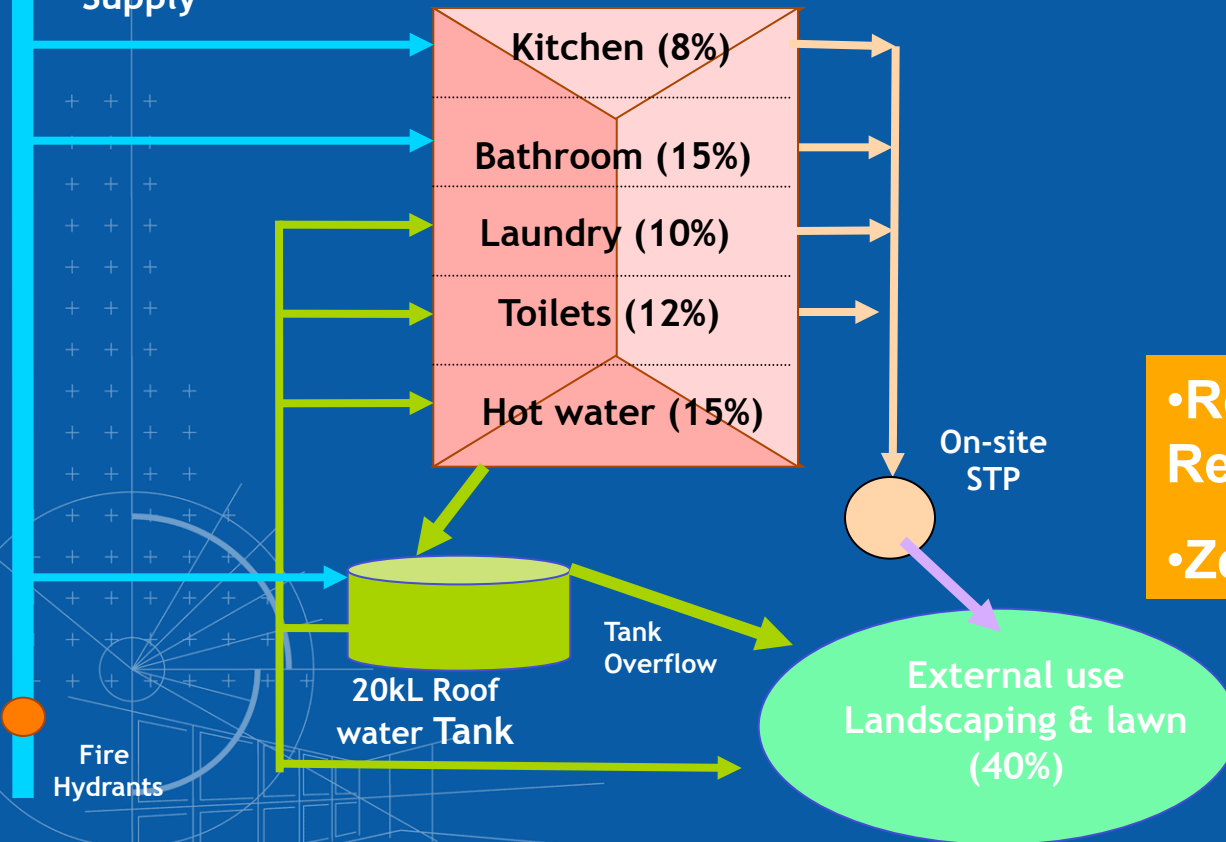


IWA Offices and Regional Groupings



Concept Applicable at Household Level

Potable Water Supply



- Reduced water use from Reticulation by 60%
- Zero wastewater discharge



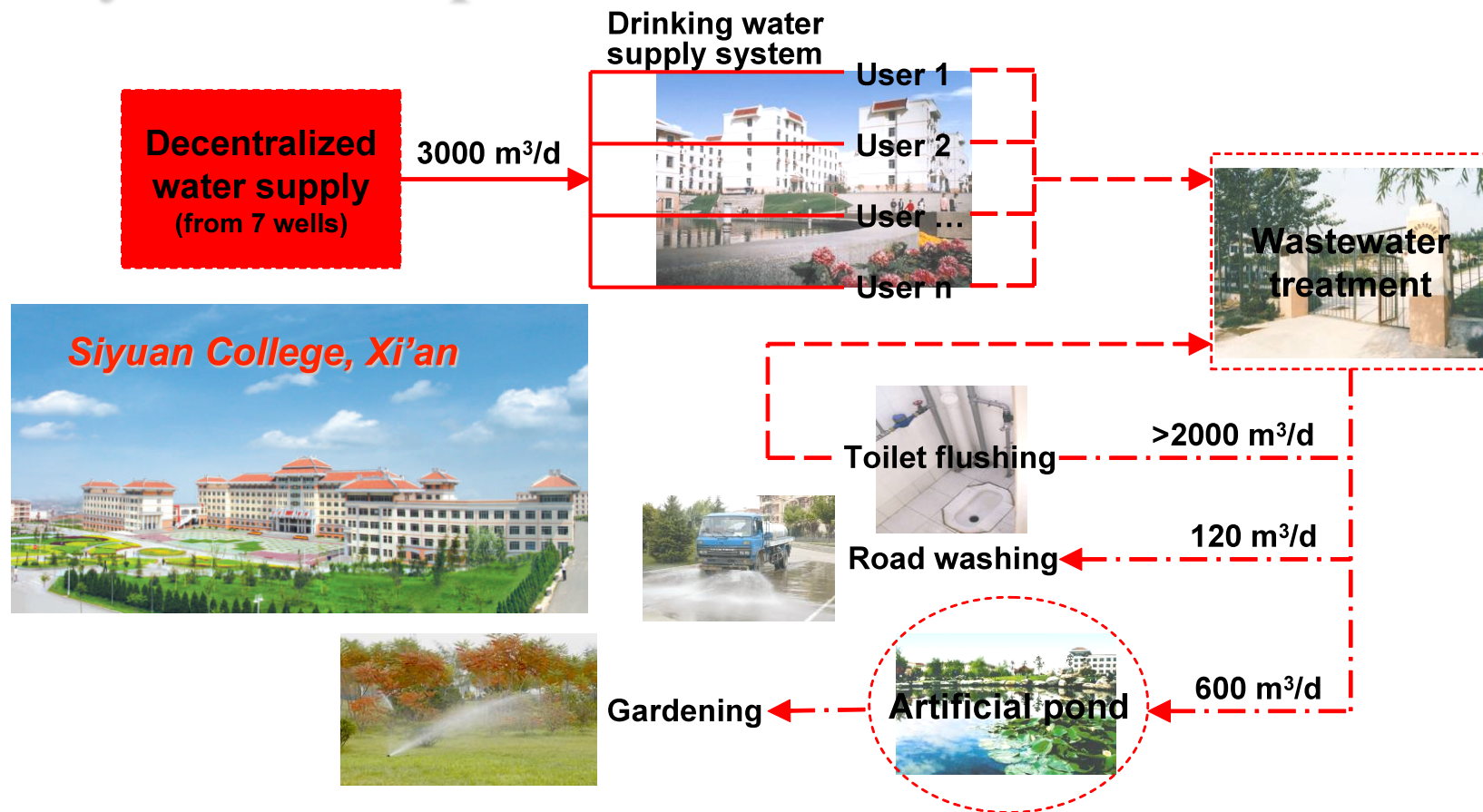
Recent Schemes With Significant Closed Loop Configurations

Scheme	% Reduction in potable water consumption	% Reduction in discharges to Waterways
Pimpama – Coomera	80%	>70%
Rouse Hill	50%	>90%
Homebush Bay- Olympic Village	67%	100%
Mawson lakes	50%	>80%



Case study 1: A college with zero discharge of wastewater

● System composition



FOUR NATIONAL TAPS



a global **network** for water professionals



Shinjuku Area

Ochiai Sewage Treatment Plant



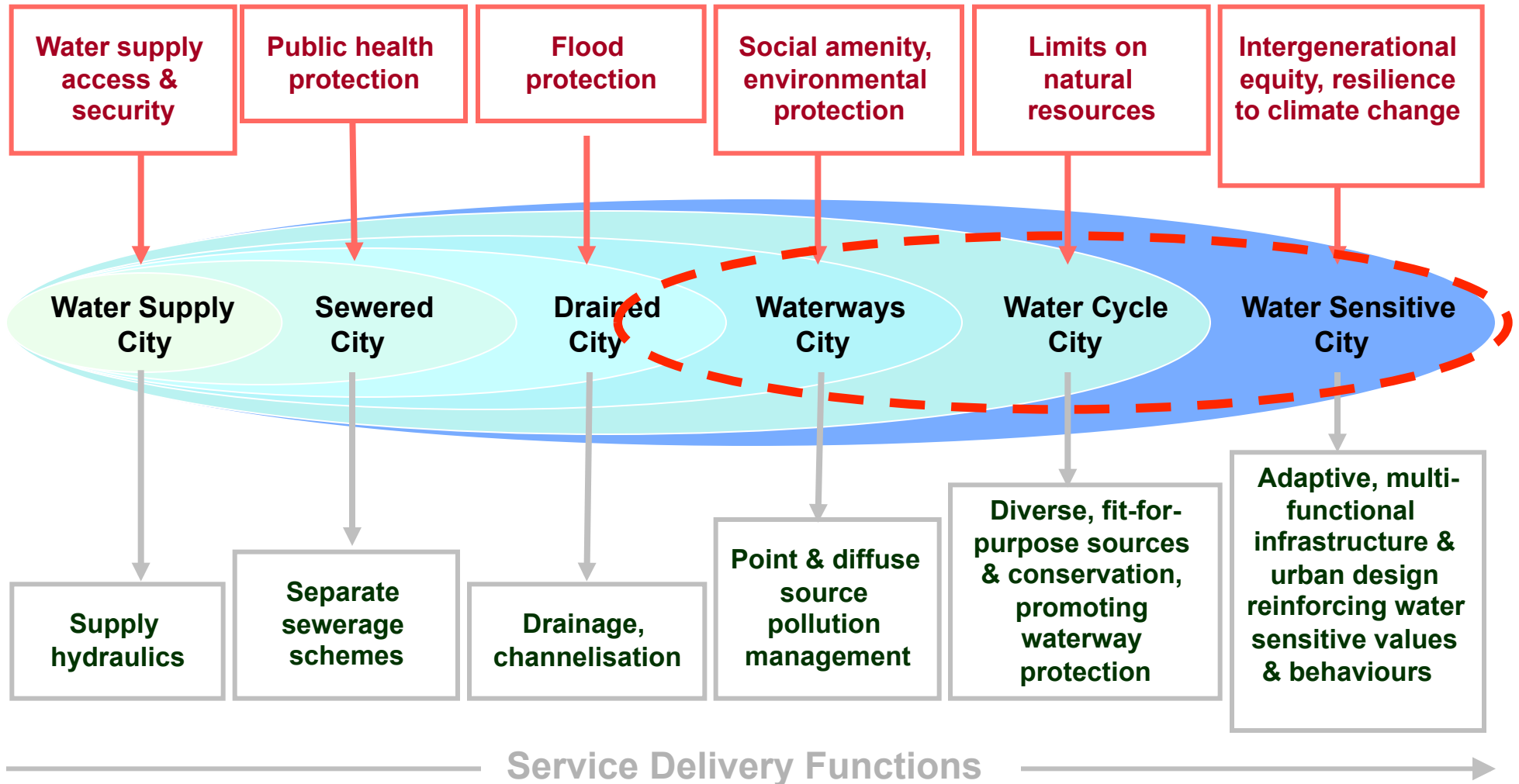


Thank You



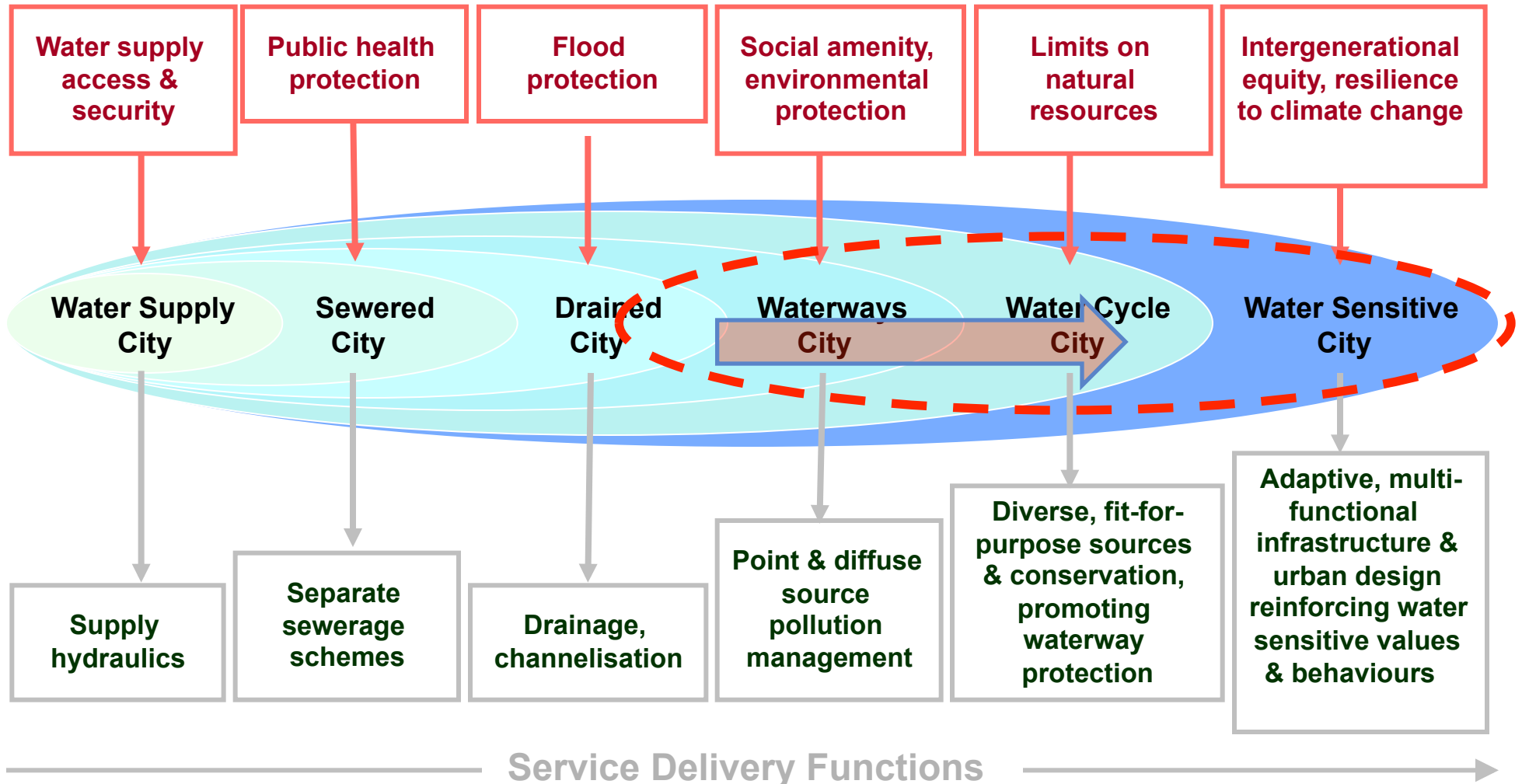
Can We Make Major Leaps Forward?

Drivers



Can We Make Major Leaps Forward?

Drivers

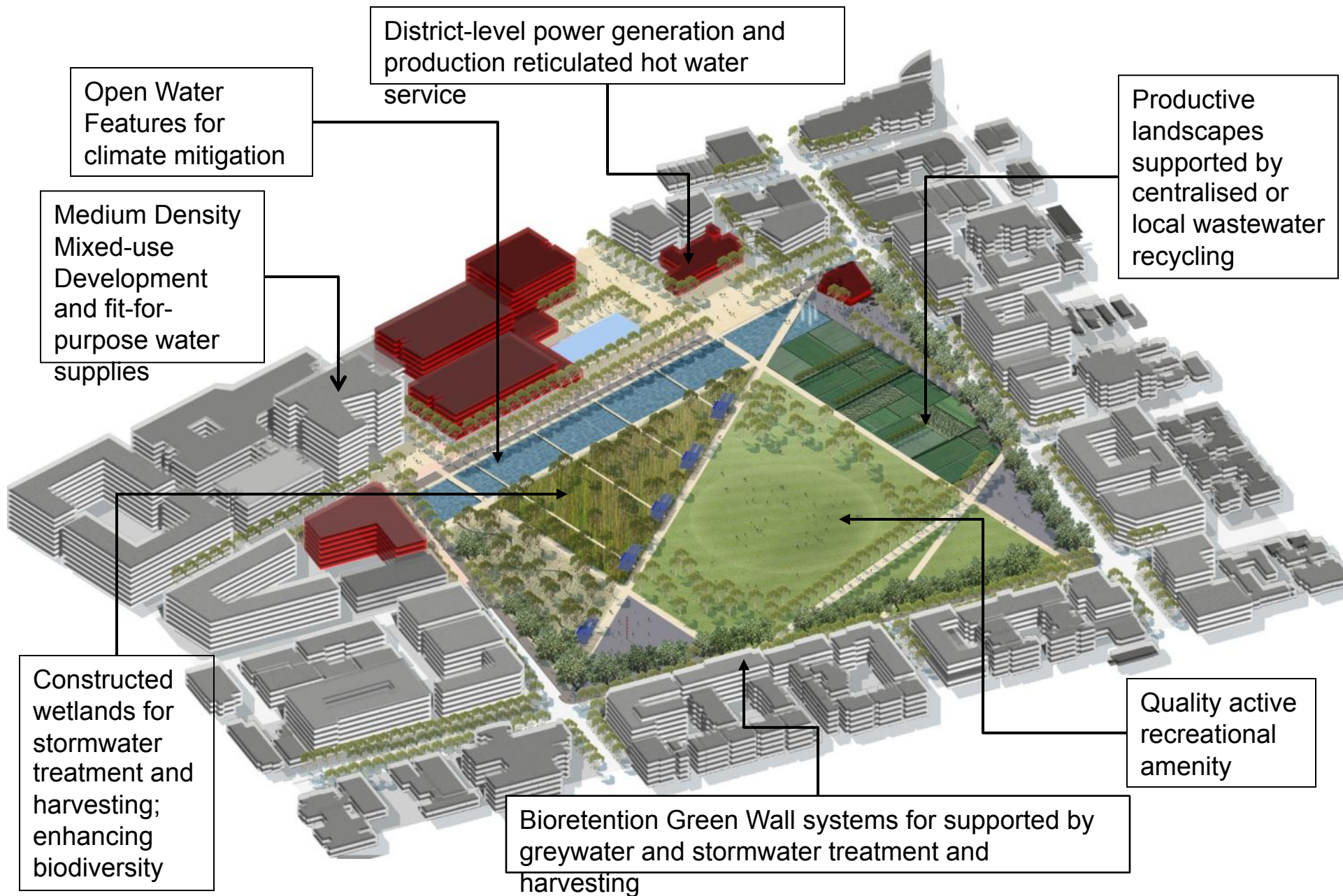


Planning the Alignment of Waterway



Punggol Reservoir

- Damming of rivers to form reservoirs creates a need for linkage for water transfer
- Landscape waterway conceptualised in-lieu of conventional drain
- Planning overcame existing undulating terrain and rail transit structures
- Meanders through Punggol Town (4.2km long, 4m deep, 10m - 85m wide)
- Adds 500,000m³ of water to the existing Punggol and Serangoon Reservoirs



A Water Sensitive Precinct

MY WATERWAY@PUNGGOL

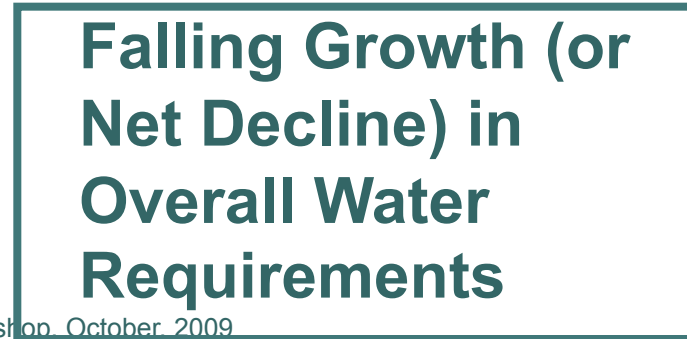
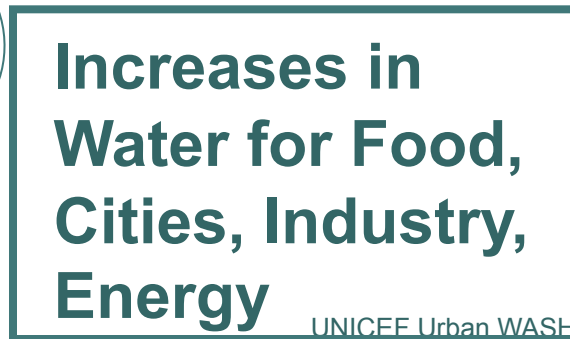
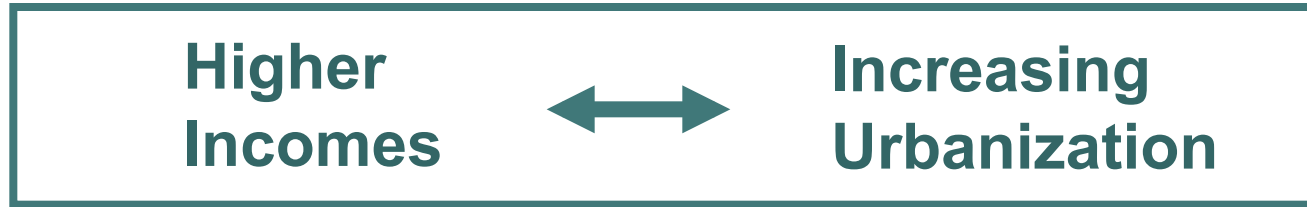
Singapore's first Man-made Waterway



**HOUSING &
DEVELOPMENT
BOARD**
REPUBLIC OF SINGAPORE



Population Dynamics 401



Force A Dominates Water Needs in Next 20 Years



UNICEF Urban WASH workshop, October 2009

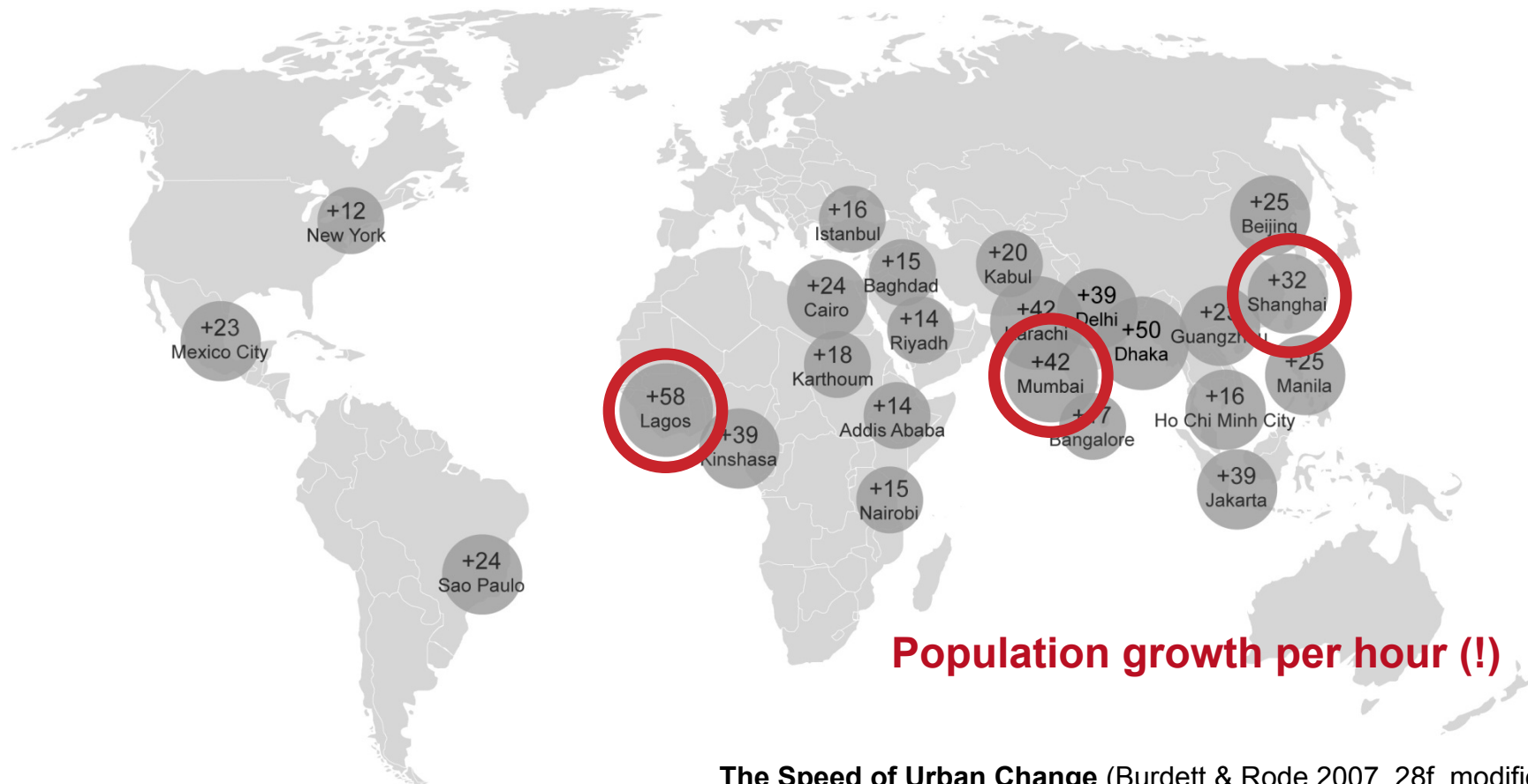
Force A

Force B



Challenge II: Urban Growth (Capita/hr)

In total around 1 Million per week in cities



Population growth per hour (!)

The Speed of Urban Change (Burdett & Rode 2007, 28f. modified)

