



Presentation from  
**2015 World Water  
Week in Stockholm**

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# Water-Energy Nexus in Cities

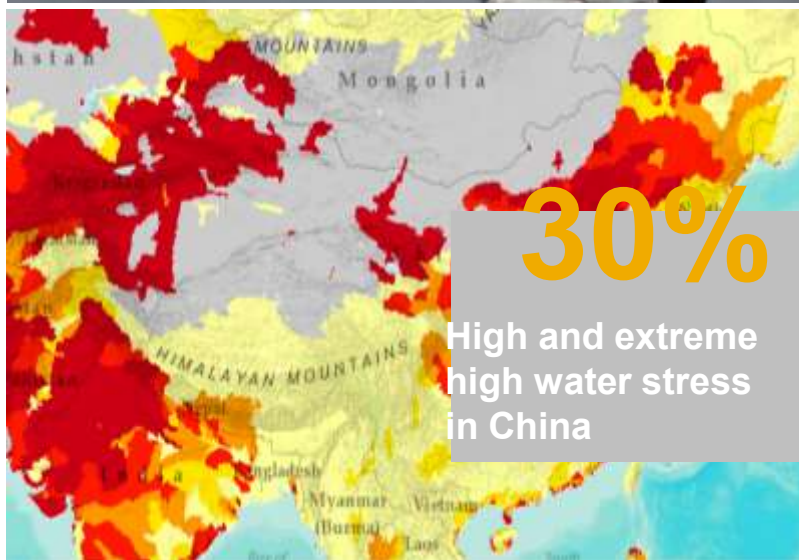
*How to Secure Water and Energy Amidst Rapid Urbanization, Stockholm Water Week, 23<sup>rd</sup> Aug 2015*

*Dr. Lijin ZHONG, China Water Lead/Senior Associate, Water Program*

ages @ 2010

(图片来源: etiennems/Flickr)

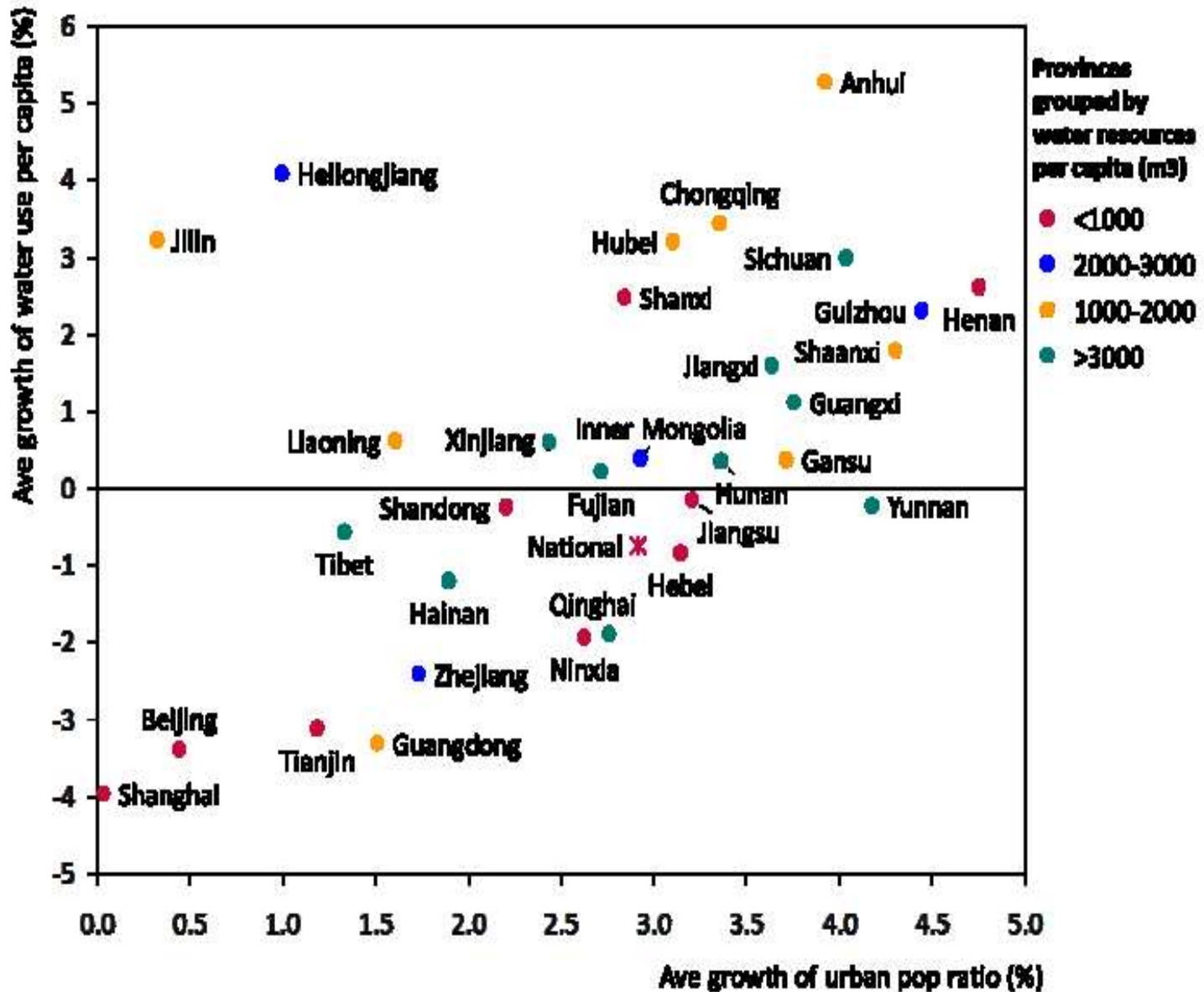
# CHALLENGES IN CHINESE CITIES: Air pollution, congestion, water shortage, energy consumption, GHG emissions



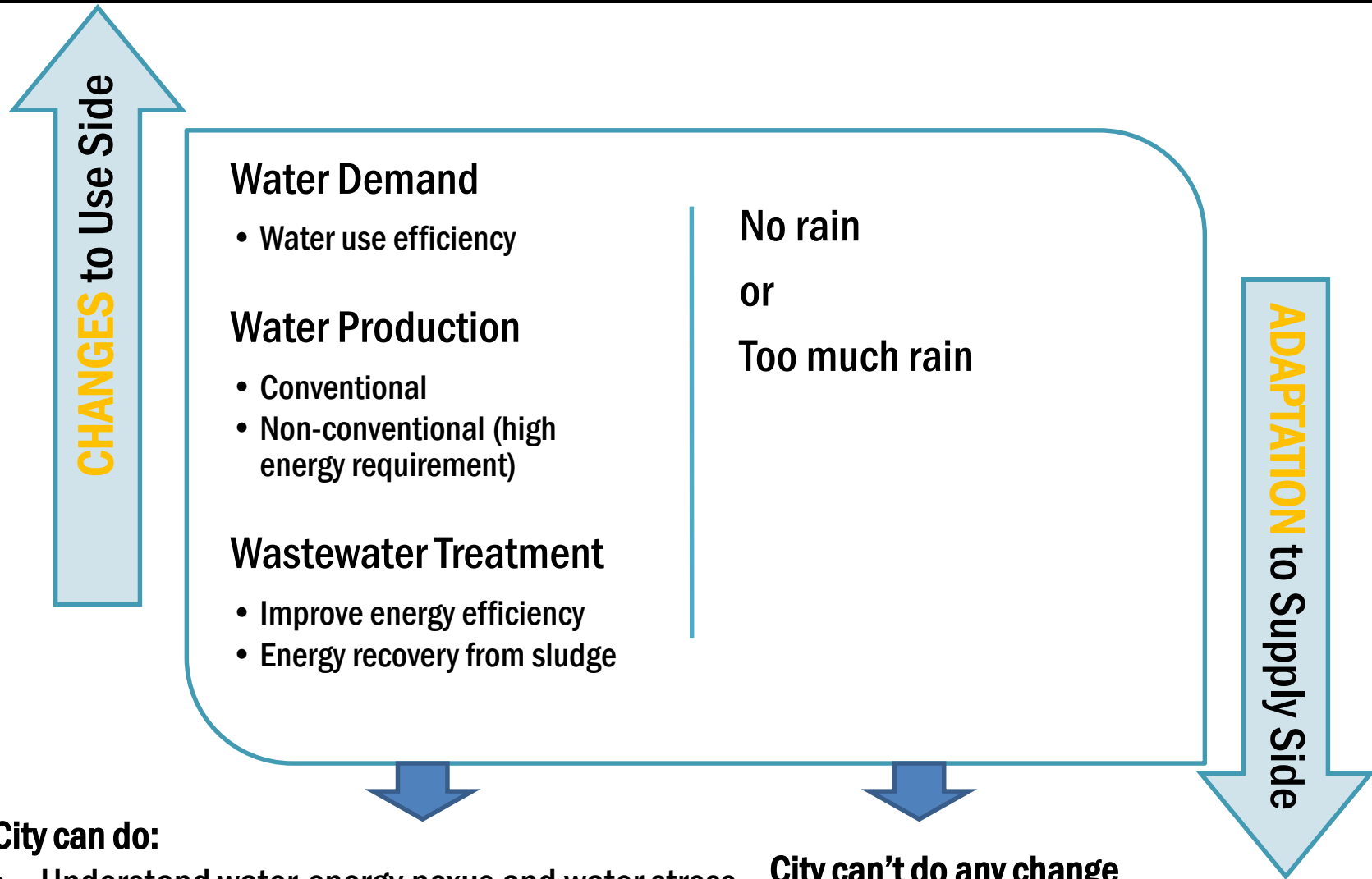
# WATER CHALLENGES IN CITIES: Too Much, Too Little, Too Dirty



# URBANIZATION SPEED UP THE INCREASE IN WATER DEMAND



(Source: WRI, Draft Not for Distribution)



# WRI SUSTAINABLE AND LIVABLE CITIES PROJECT: WEN IN CITIES



## Chengdu:

- Develop a roadmap for enhancing energy efficiency of wastewater system
- Contribute to Chengdu's low carbon city targets

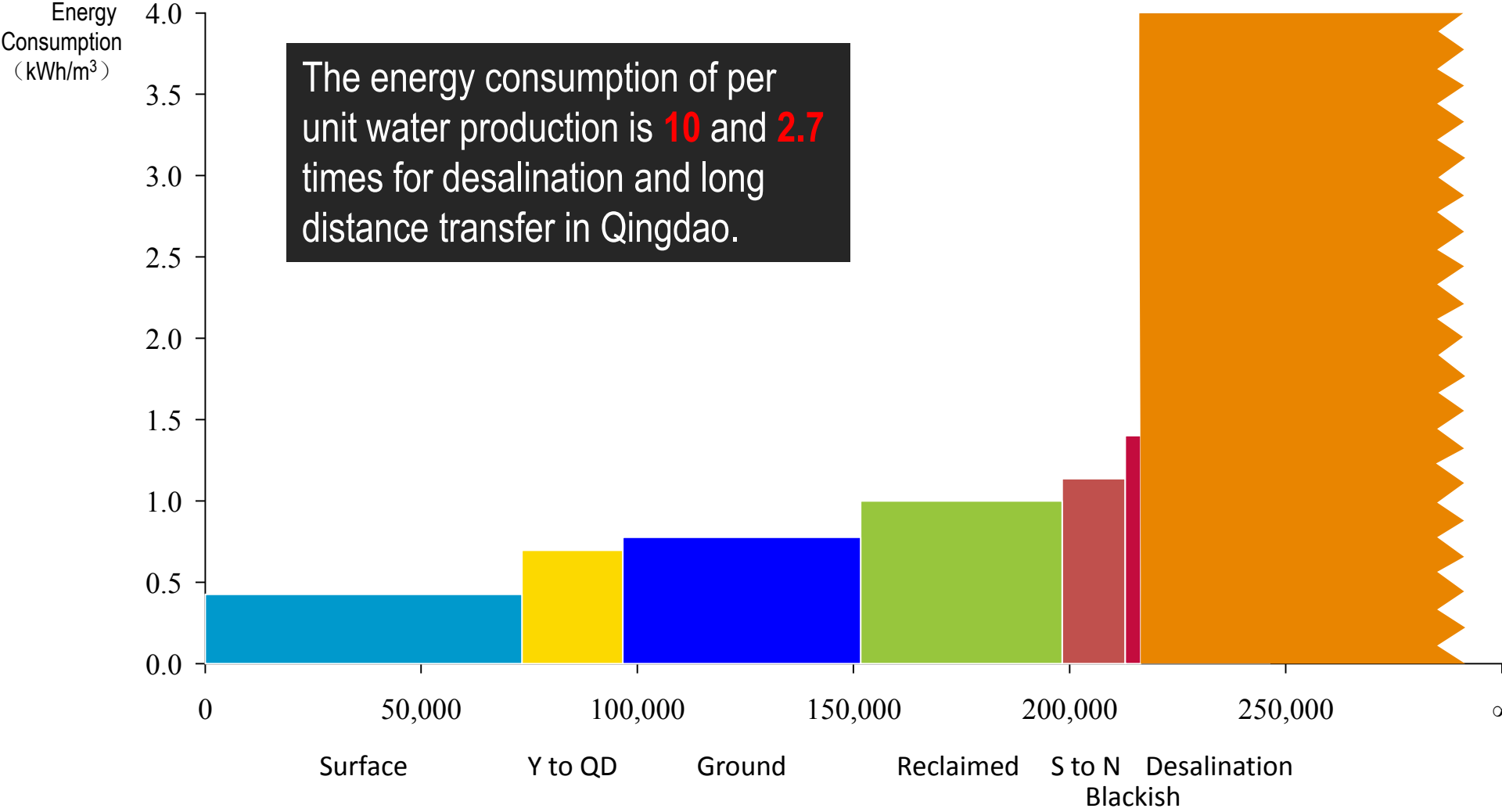
## Qingdao:

- Analyze energy consumption and GHG emission of various water sources
- Improve decision-making process of water sources planning by equipping policy makers with tools to factoring energy considerations in Qingdao

## Xiangyang:

- Evaluate "3E" performance of sludge treatment and disposal methods;
- Provide support to MOHURD for developing technical policies on methane capture from sludge.

# WEN IN URBAN WATER: Increased energy intensity with the use of non traditional water resources (Qingdao case)

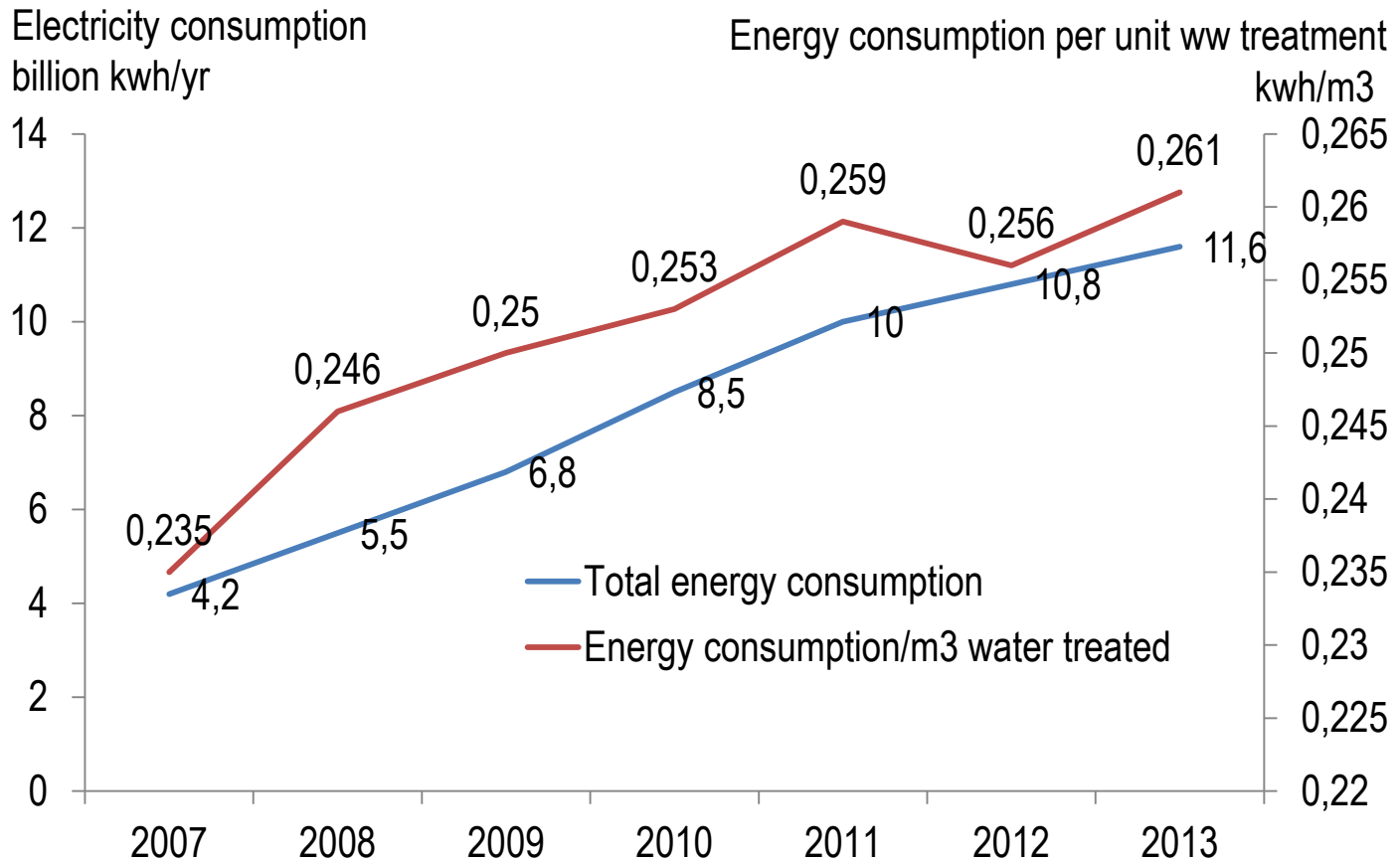


(Sources: WRI, 2014)

Water Supply Potential (10 thousand m<sup>3</sup> per year)



# WEN IN URBAN WATER: Increased energy intensity with higher water discharge standards

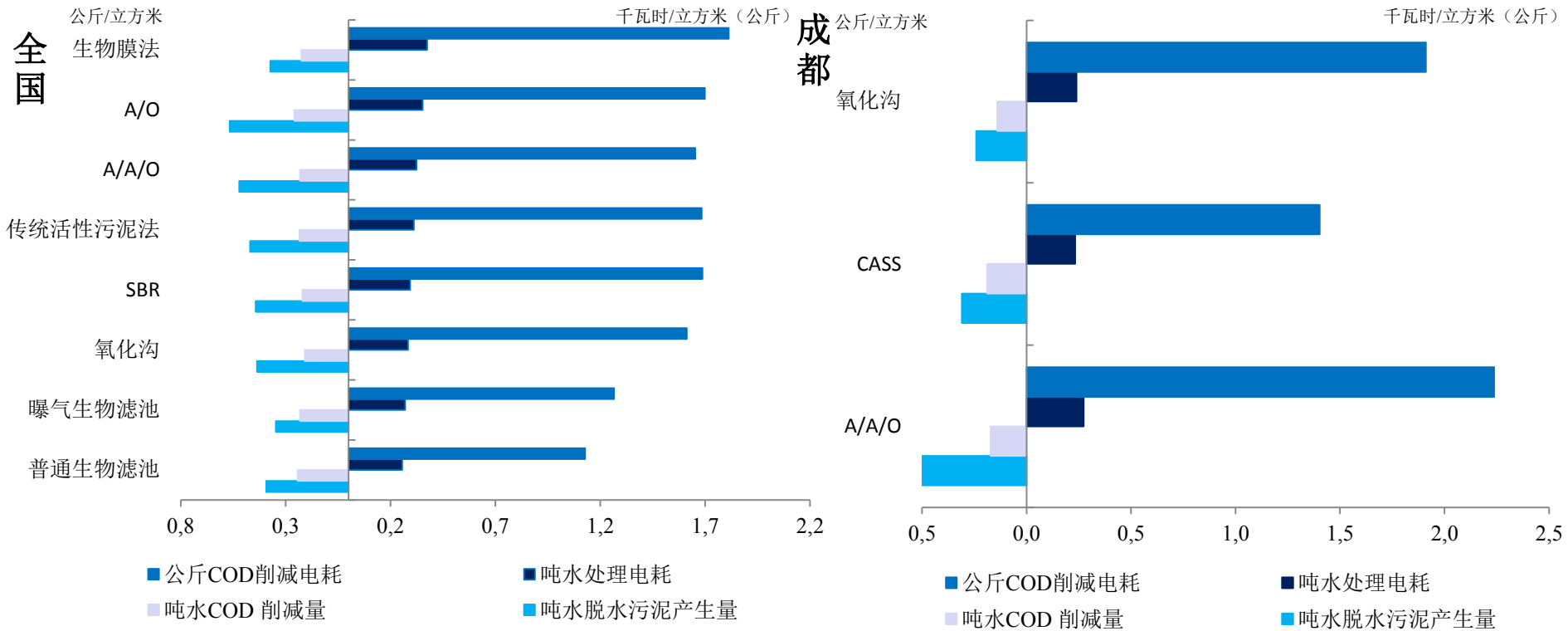


(Draft, Not for Distribution; Source: WRI estimate)

## Energy Consumption of Municipal Wastewater Treatment

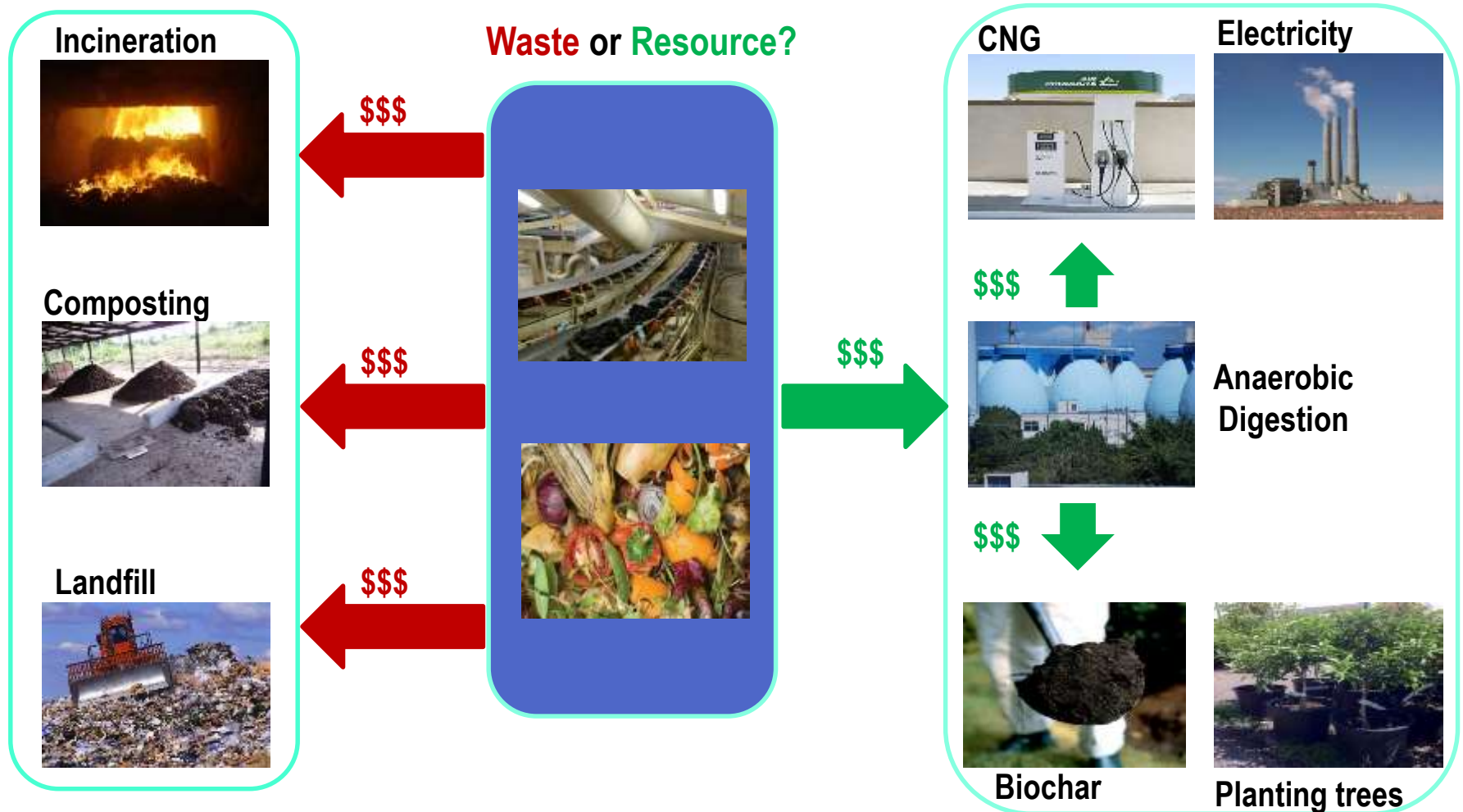
With the higher requirements on water quality and reclaimed water reuse, the energy consumption of urban wastewater system increased 80% compared with 2007. The energy intensity of per unit wastewater treated increased 11%.

# WEN IN URBAN WATER: Potential Energy Efficiency Improvement (Chengdu Case)



- Over half WWTPs are below the average energy efficiency per unit wastewater treatment. Estimate suggests that over 6 billion kilowatt-hours can be potentially saved compared to the most energy efficient plant.
- Electricity consumption for unit WW treatment in Chengdu is similar as the national average, but the one for unit COD removal in Chengdu is above the national average

# WEN IN URBAN WATER: Changing Sludge from Waste to Resources (Xiangyang Case)



Selection of disposal methods decides if sludge exists as waste or resource.

## WEN IN URBAN WATER: Some issues

Lacking consideration of energy as a factor in water resource selection and wastewater treatment

Insufficiency in R&D and infrastructure investment (e.g. pipes construction)

Considering water, energy and climate change as separate issues

Ignorance of the impacts of urban water system on climate change

Lacking statistics on the energy consumption of water supply and wastewater treatment

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