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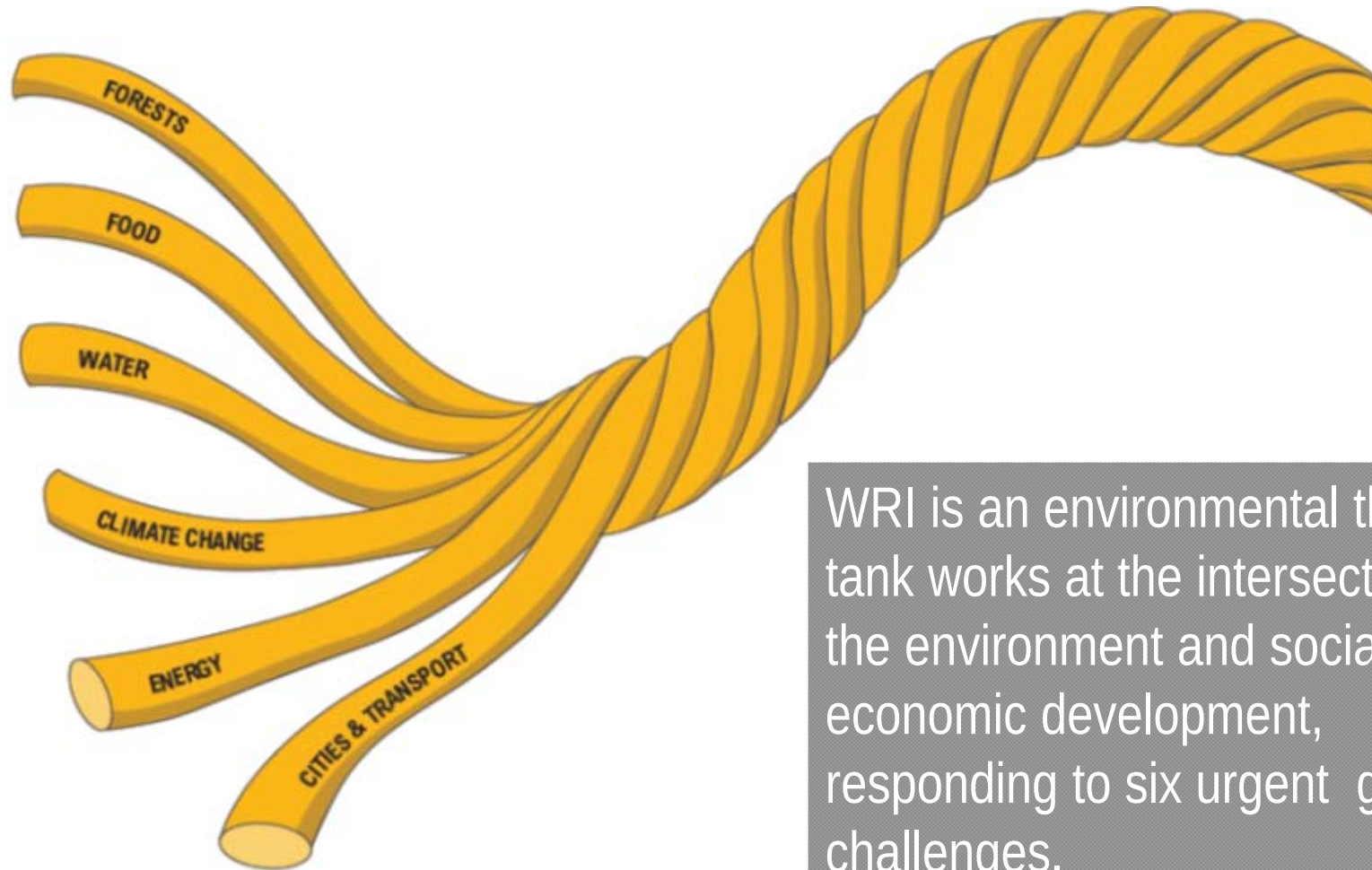
Towards a Water-Energy Secure Future

Water-Energy Nexus in China

5th Forum on the Climate-Energy Security Nexus, 4th Nov 2014, Paris

Dr.Lijin Zhong, China Water Lead/Senior Associate, Water Program/China Office

ABOUT WORLD RESOURCES INSTITUTE



WRI is an environmental think tank works at the intersection of the environment and social economic development, responding to six urgent global challenges.

Agenda

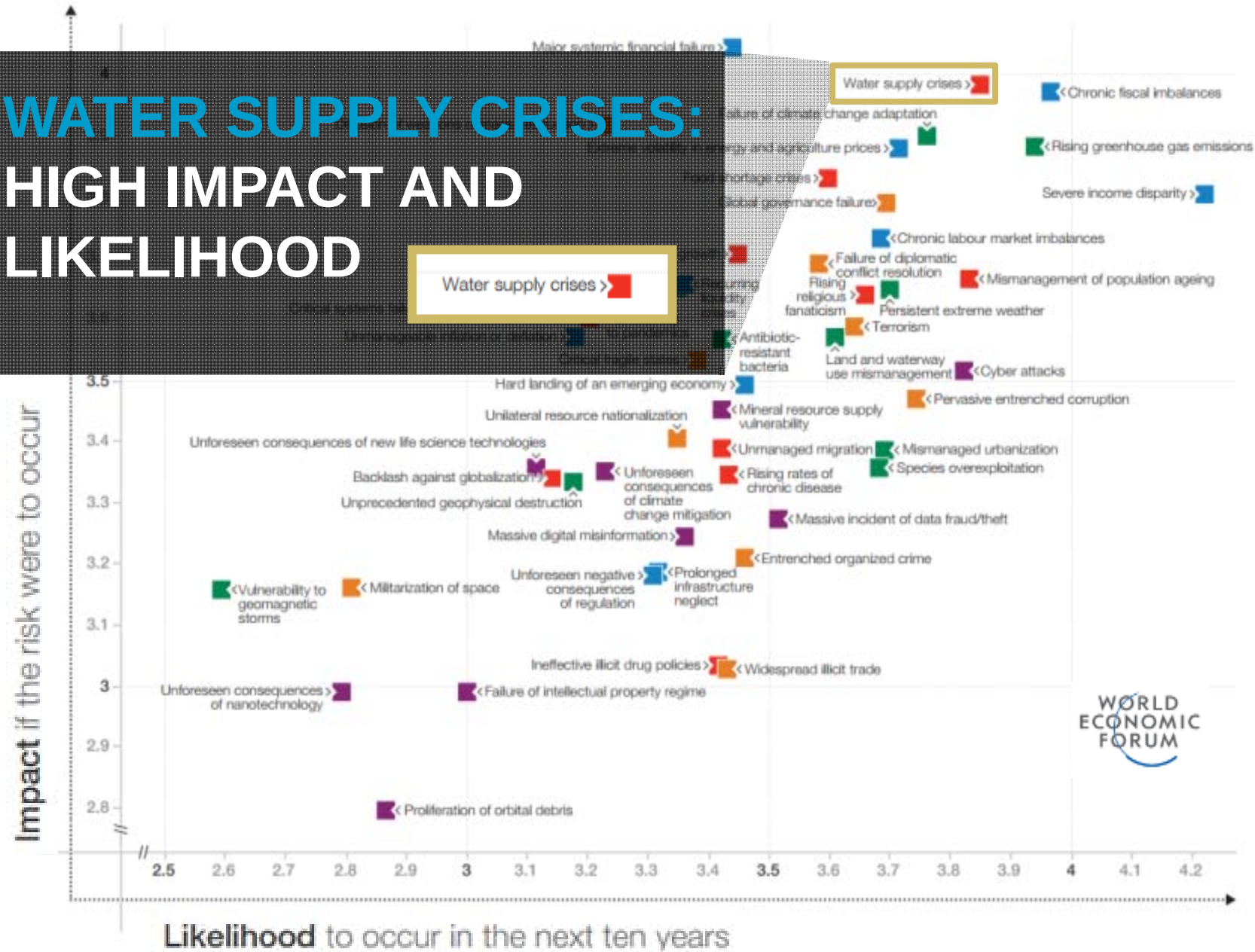
Water Risks

WEN: Energy for Water

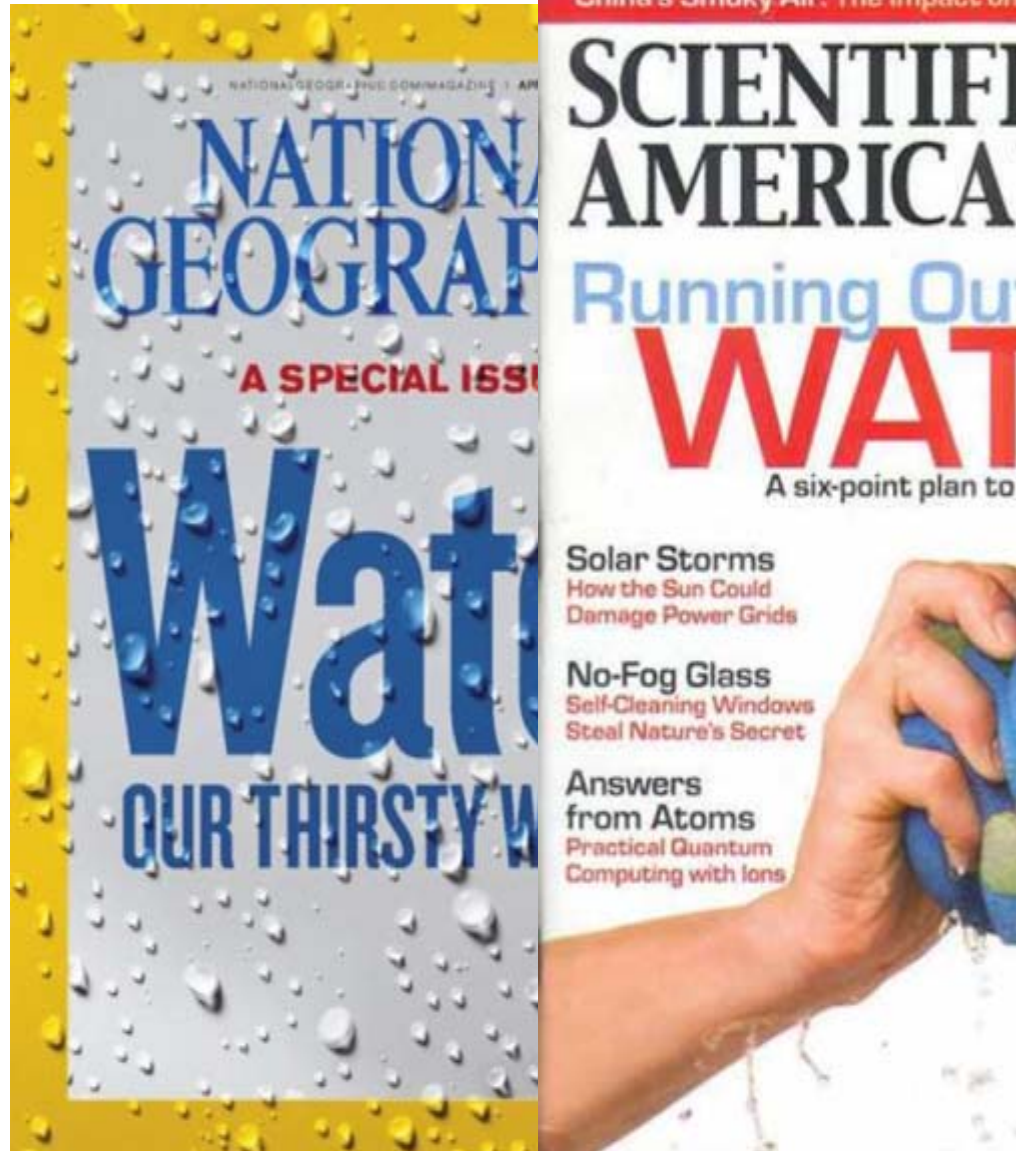
WEN: Water for Energy

Possible Solutions

WATER SUPPLY CRISES: HIGH IMPACT AND LIKELIHOOD



WATER SCARCITY IN NEWS



theguardian | TheObserver

News | US | World | Sports | Comment | Culture | Business | Money

Environment > Water

Why global water shortages pose threat of terror and war

From California to the Middle East, huge areas of the world are drying up and a billion people have no access to safe drinking water. US intelligence is warning of the dangers of shrinking resources and experts say the world is 'standing on a precipice'



Suzanne Goldenberg

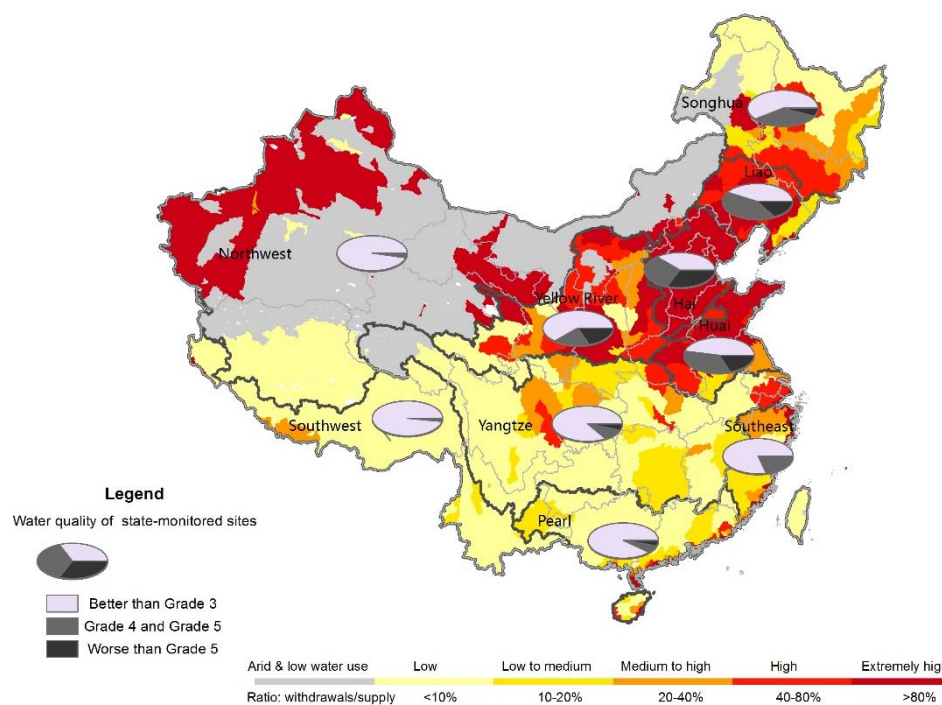
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The Observer, Saturday 8 February 2014

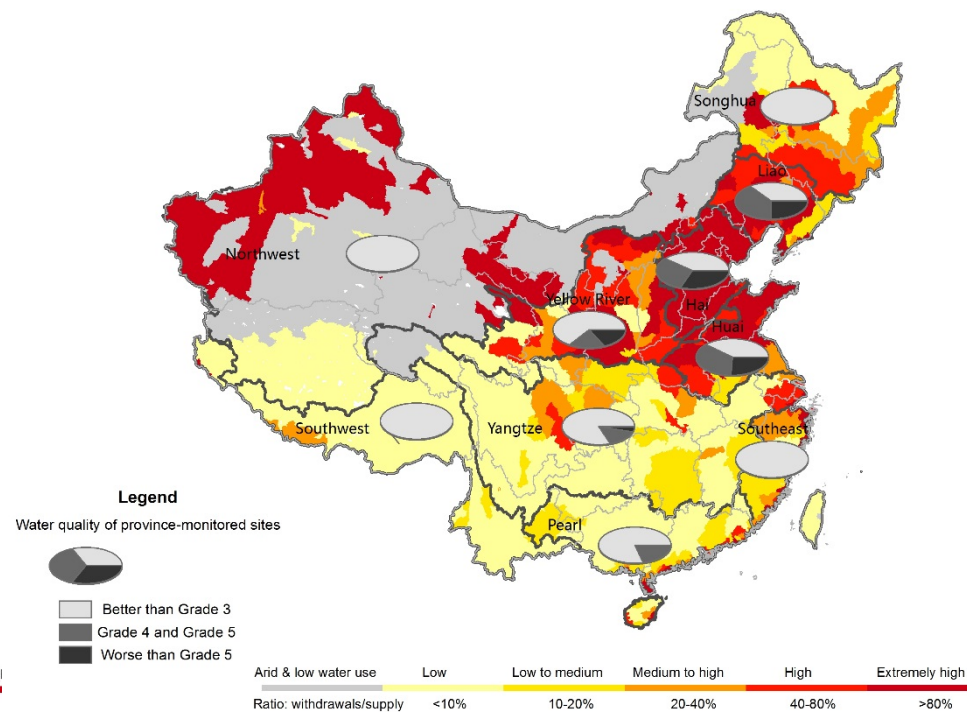
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WATER RISK IN CHINA: High water stress



State Monitored Sections



Provincial Monitored Sections

(Draft, Not for Distribution)

WATER RISK IN CHINA: Climate change



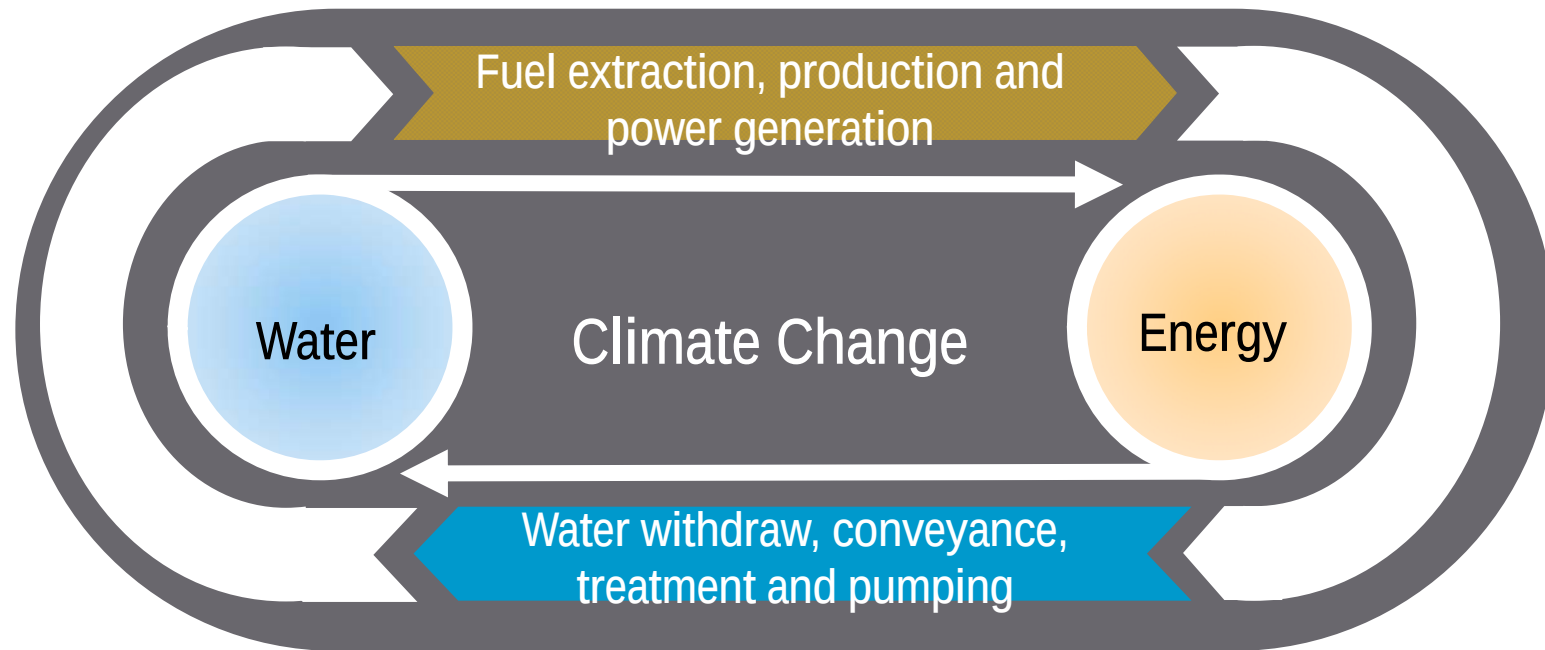
In May 2014, 5 provinces were subjected to persistent and heavy rainfall, leading to 1.2 million people facing with urban flooding

WATER RISK IN CHINA: Climate change



Since July 2014, 13 provinces were subjected to severe droughts, leading to 8.2 million people facing with water shortage

WATER-ENERGY NEXUS



- Water and energy are **interlinked**
- **Increased water demand** in energy sector: a big challenge for water security
- **Increased energy intensity** in urban water system: a potential challenge for low carbon city development

Agenda

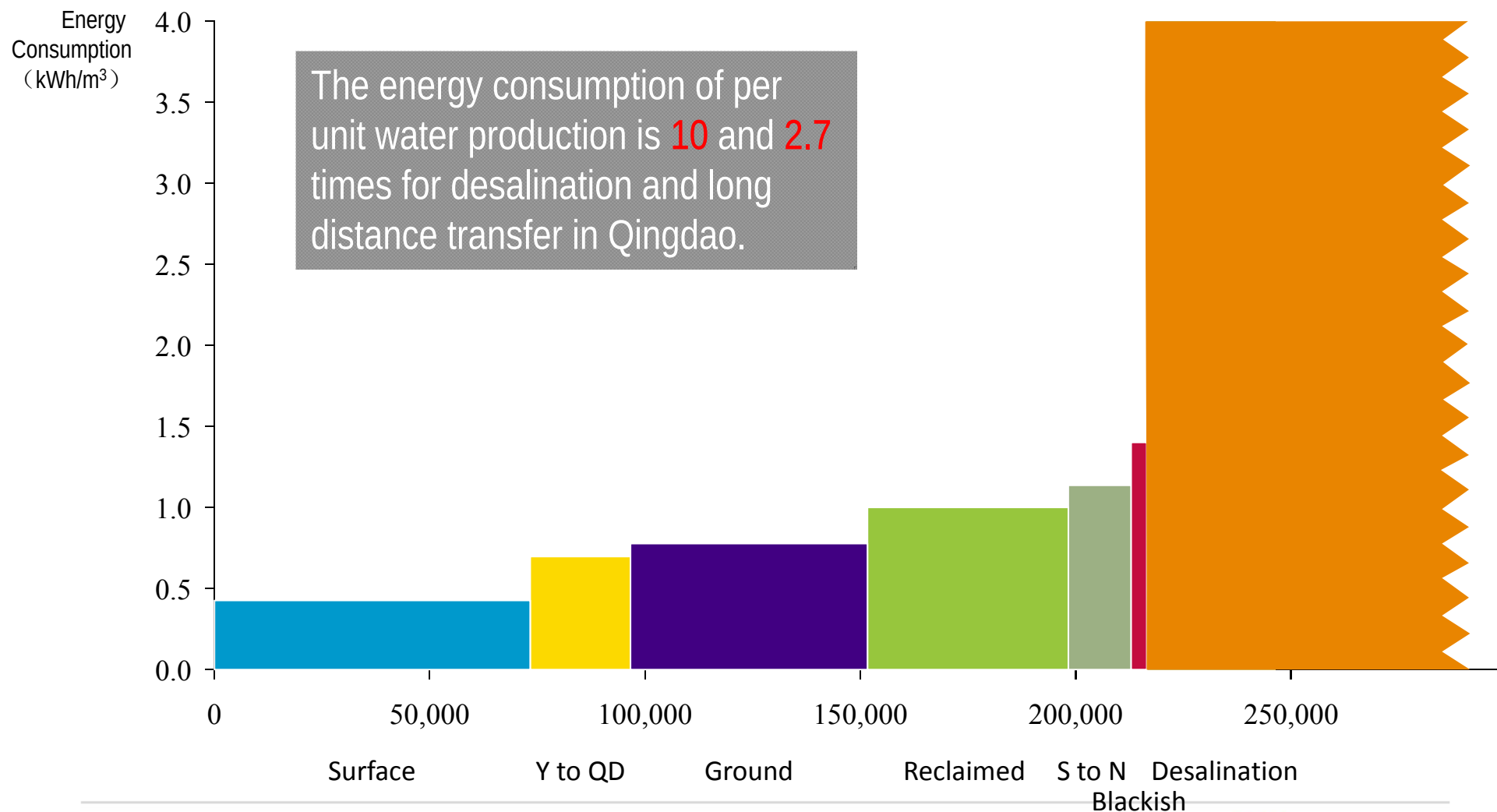
Water Risks

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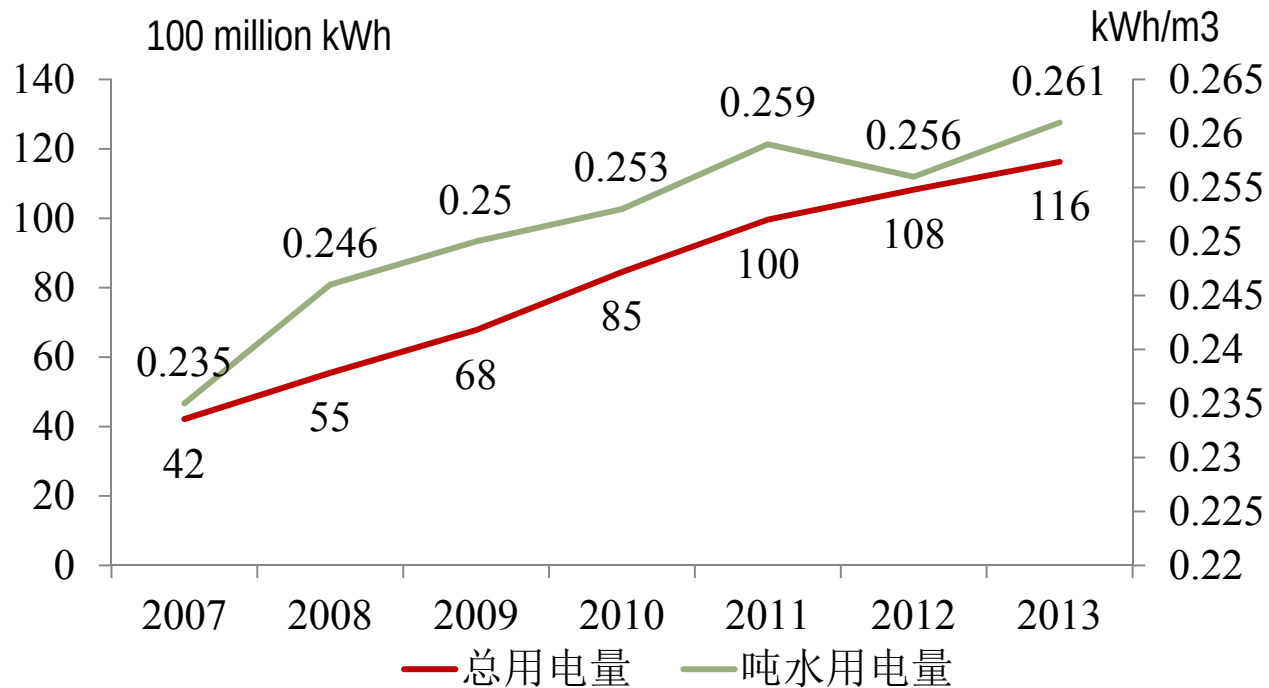
WEN: Water for Energy

Possible Solutions

ENERGY FOR WATER: Increased energy intensity with the use of non traditional water resources (Qingdao case)



ENERGY FOR WATER: Increased energy intensity with higher water discharge standards

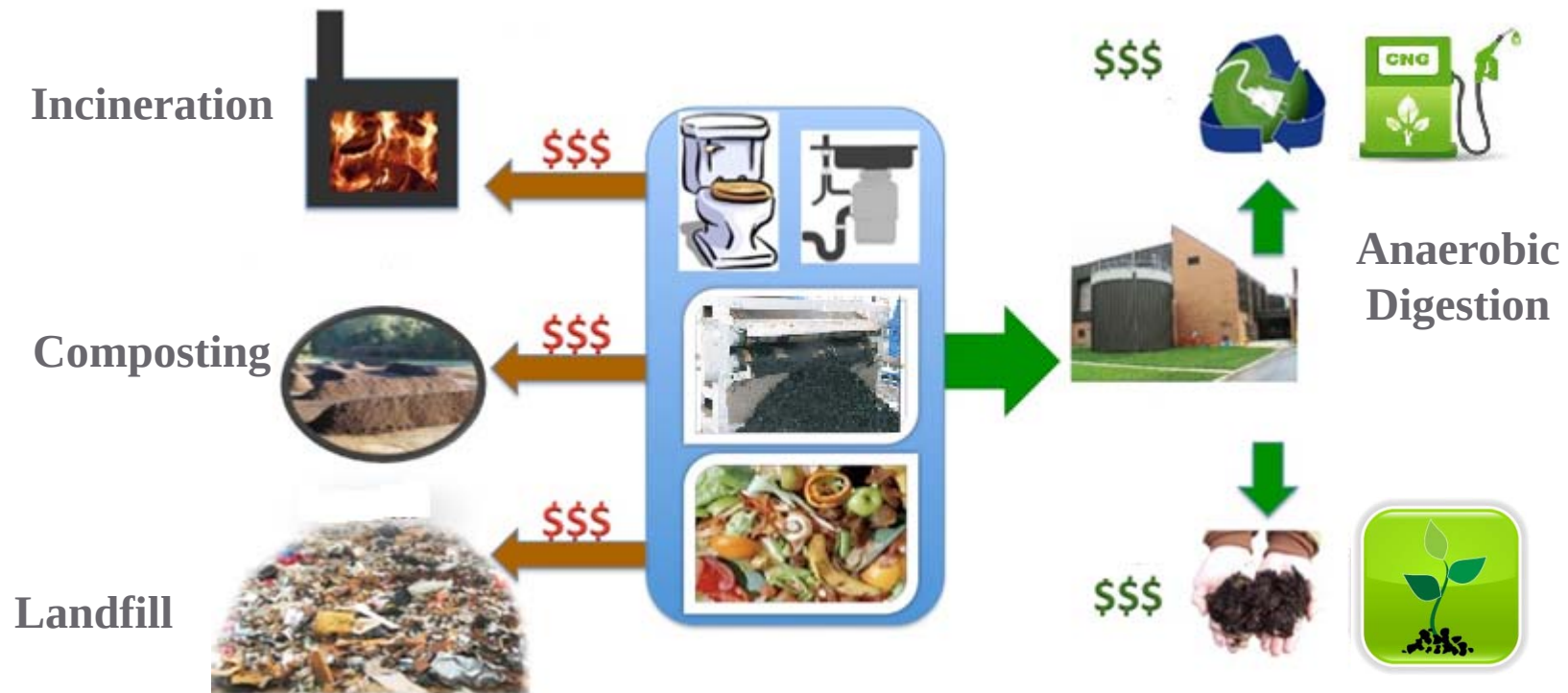


Energy Consumption of Municipal Wastewater Treatment

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%.

ENERGY FOR WATER: Recovered biogas from sludge

Waste or Resource



Agenda

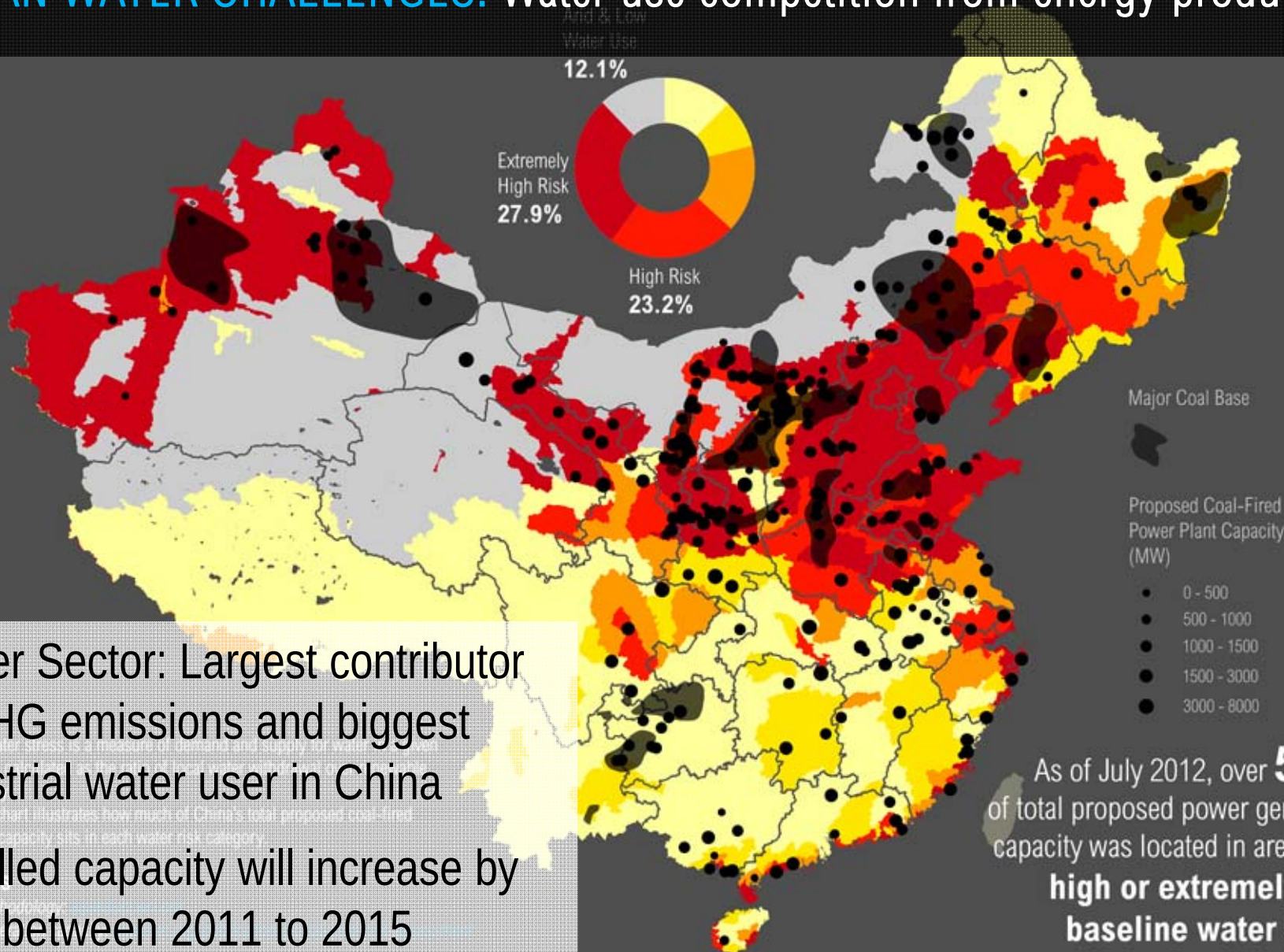
Water Risks

WEN: Energy for Water

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Possible Solutions

URBAN WATER CHALLENGES: Water use competition from energy production



URBAN WATER CHALLENGES: Water use competition from energy production

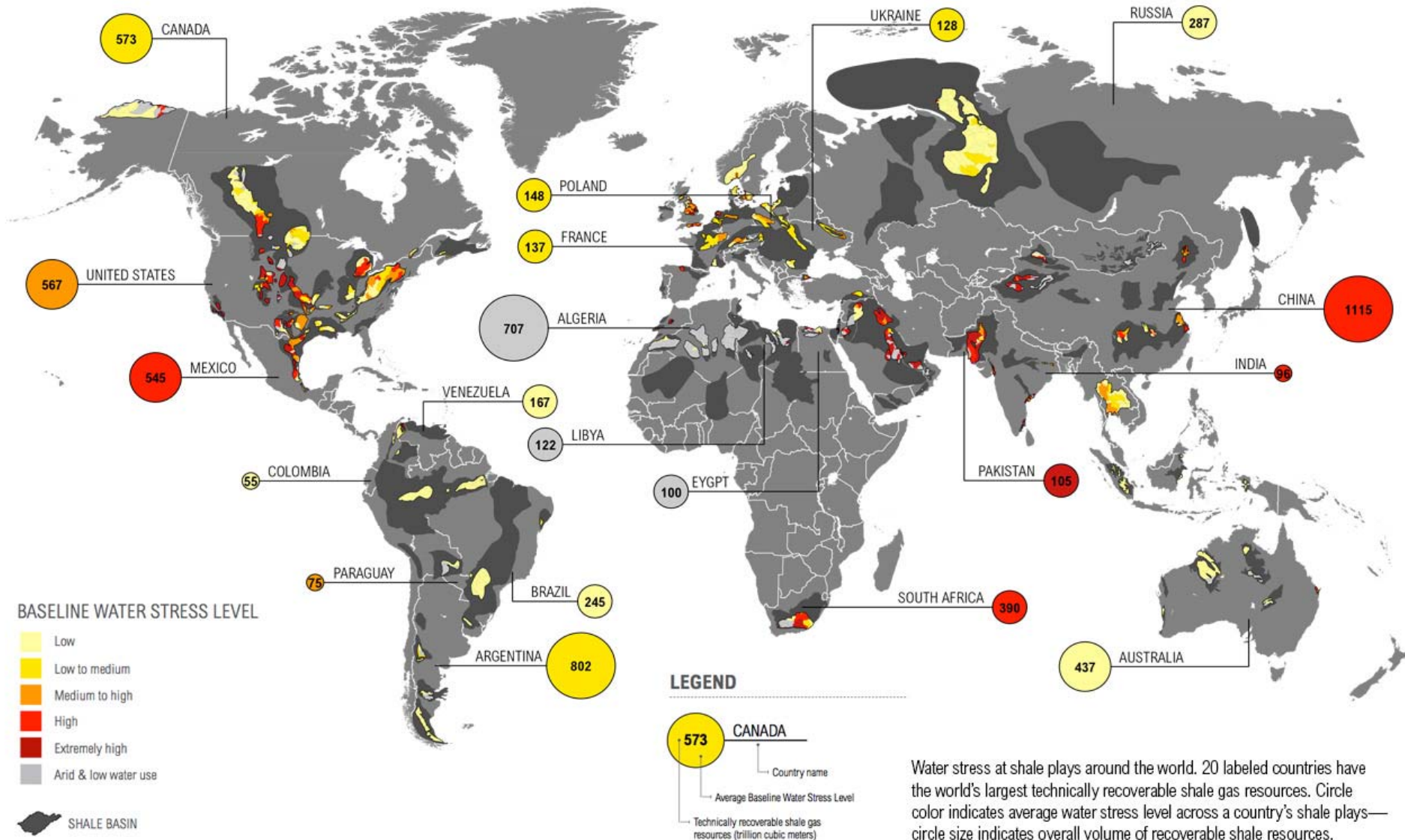
77% of approved production capacity will likely compete for water sources in **very high demand**, and/or rely on **inadequate water supplies**

NOTE

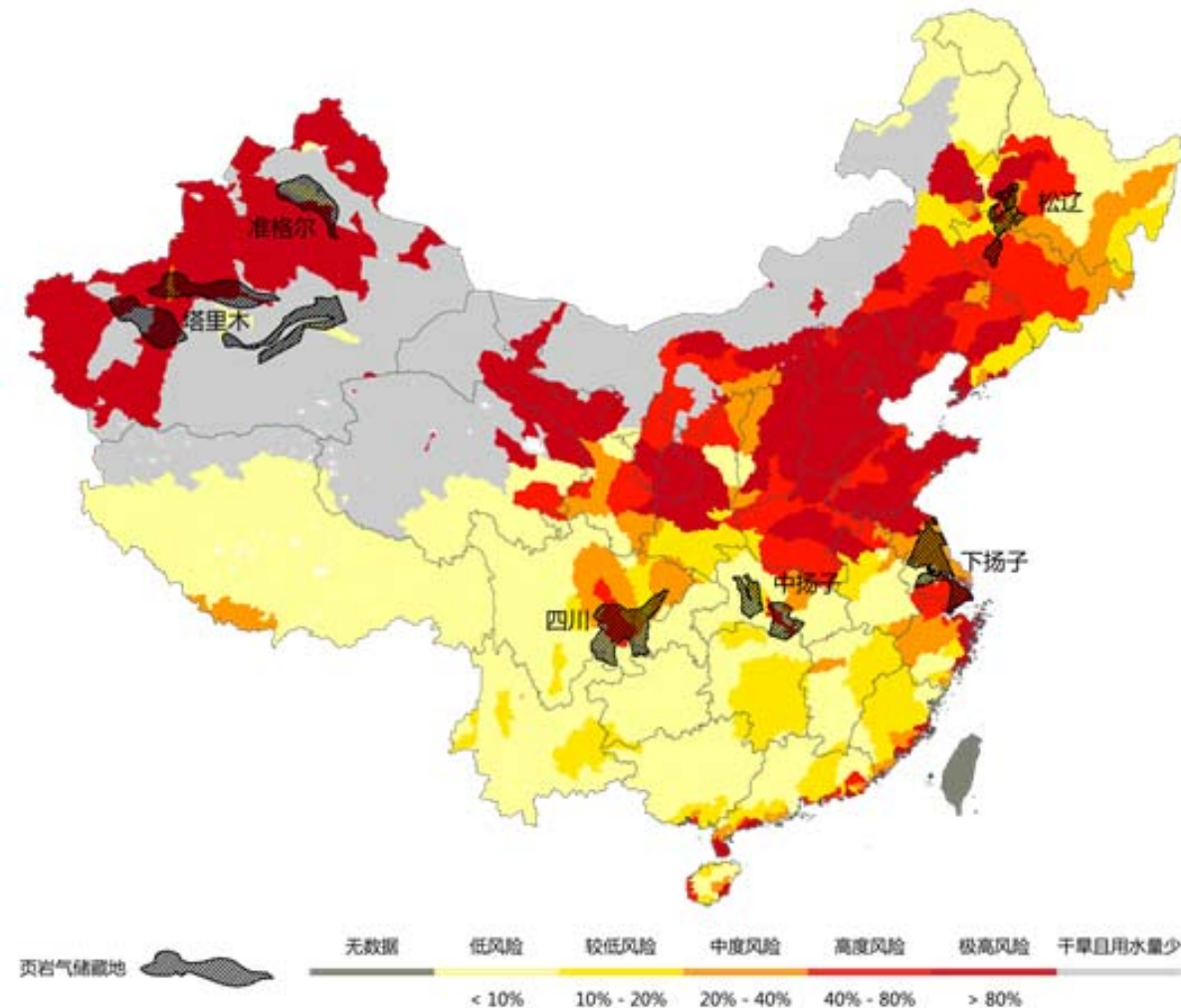
1. Baseline water stress is a measure of demand and supply for water in a given area, and is calculated as the ratio of local water withdrawal over renewable water supply.
2. The donut chart illustrates how much of China's approved SNG production capacity sits in each water risk category.

Arid & low water use Low Low to medium Medium to high High Extremely high
(Ratio: withdrawals/supply) < 10% 10% - 20% 20% - 40% 40% - 80% > 80%

Location of World's Shale Plays, Volume of Technically Recoverable Shale Gas in the 20 Countries with the Largest Resources, and the Level of Baseline Water Stress



URBAN WATER CHALLENGES: Water use competition from energy production



(WRI, 2014)

Baseline water stress and shale gas reserves

Agenda

Water Risks

WEN: Energy for Water

WEN: Water for Energy

Possible Solutions

INTIGRATED MANAGEMENT: Demand management

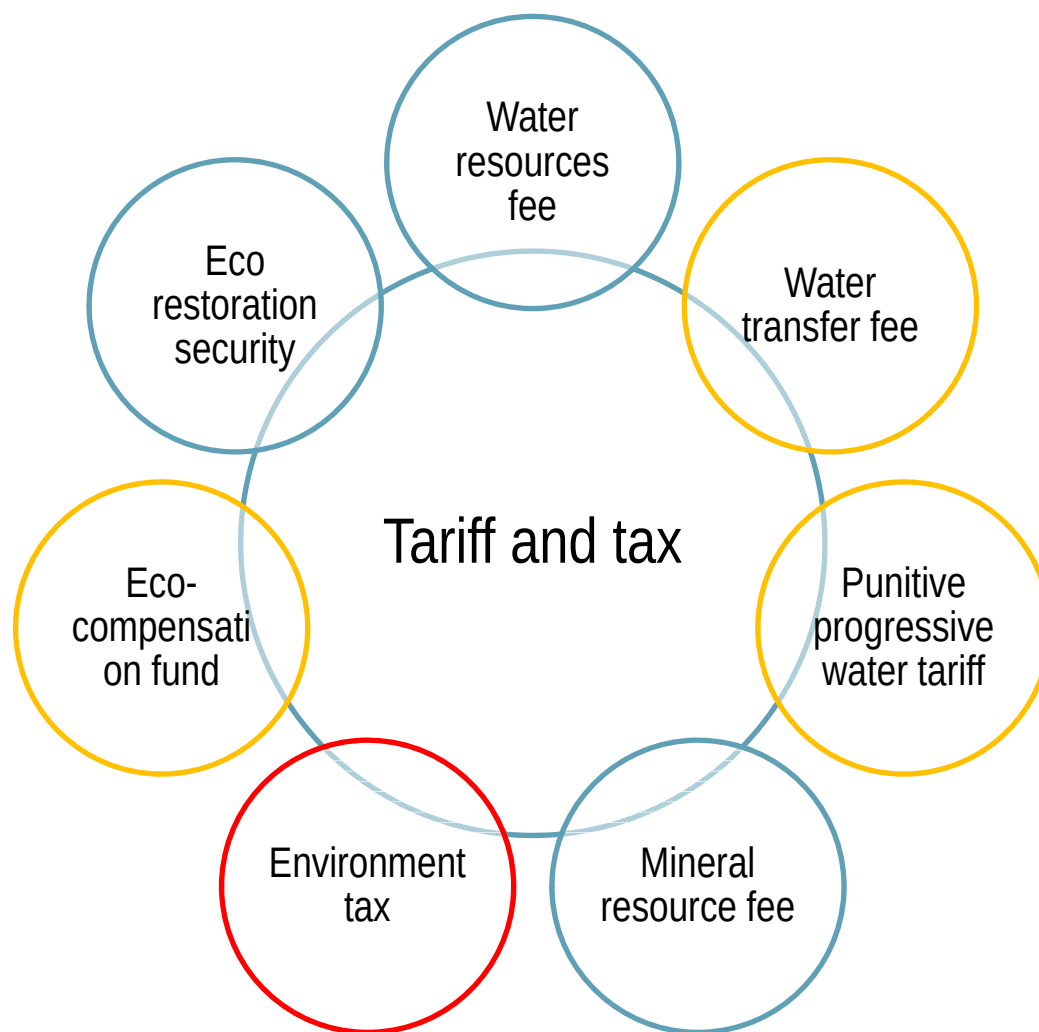


Demand
Management



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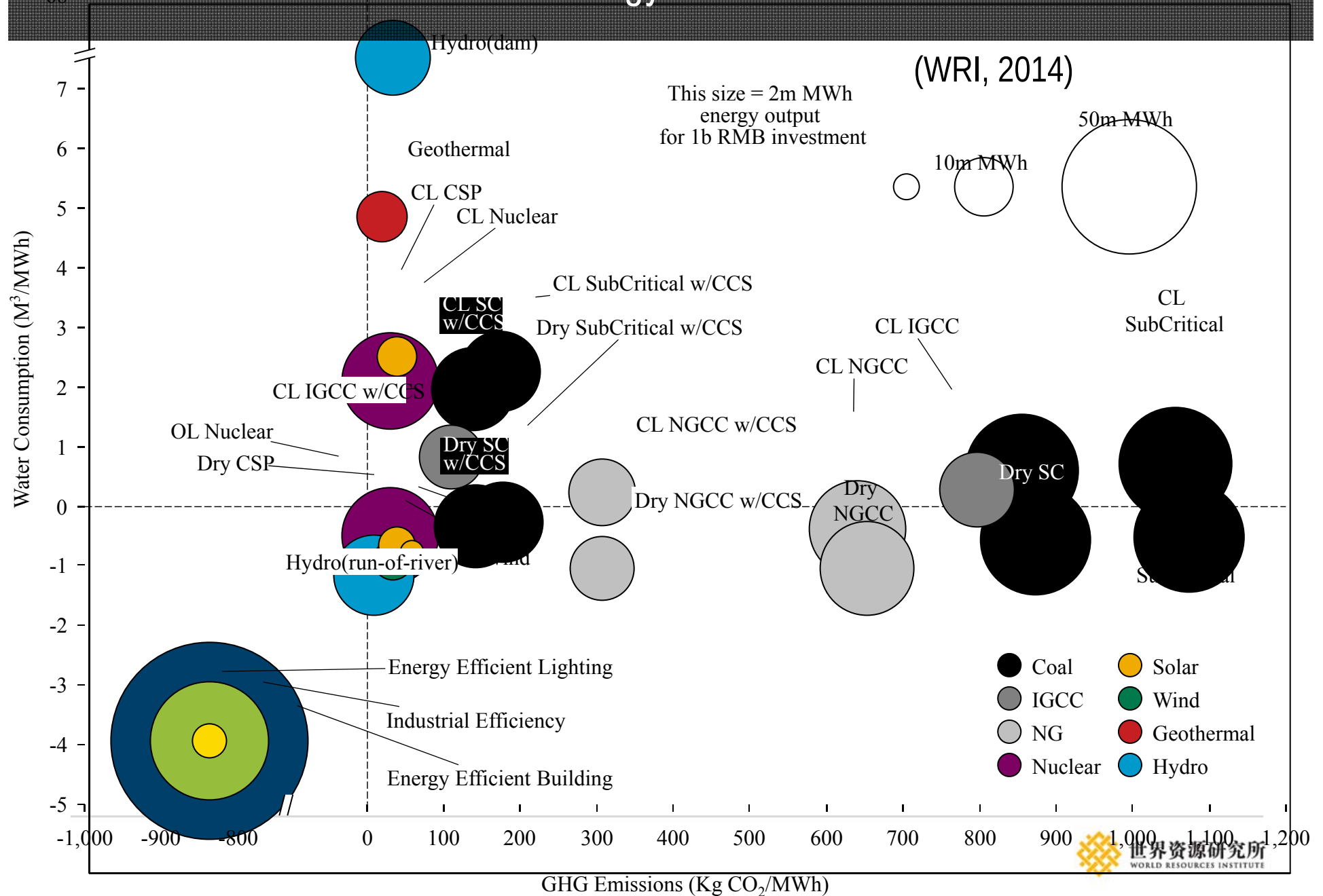
POSSIBLE SOLUTIONS: Tariff and Tax Reform



POSSIBLE SOLUTIONS : Water-Energy Tradeoff in Power Sector

(WRI, 2014)

This size = 2m MWh
energy output
for 1b RMB investment



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