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Energy Use in the Water Sector of China and the Policy Implications

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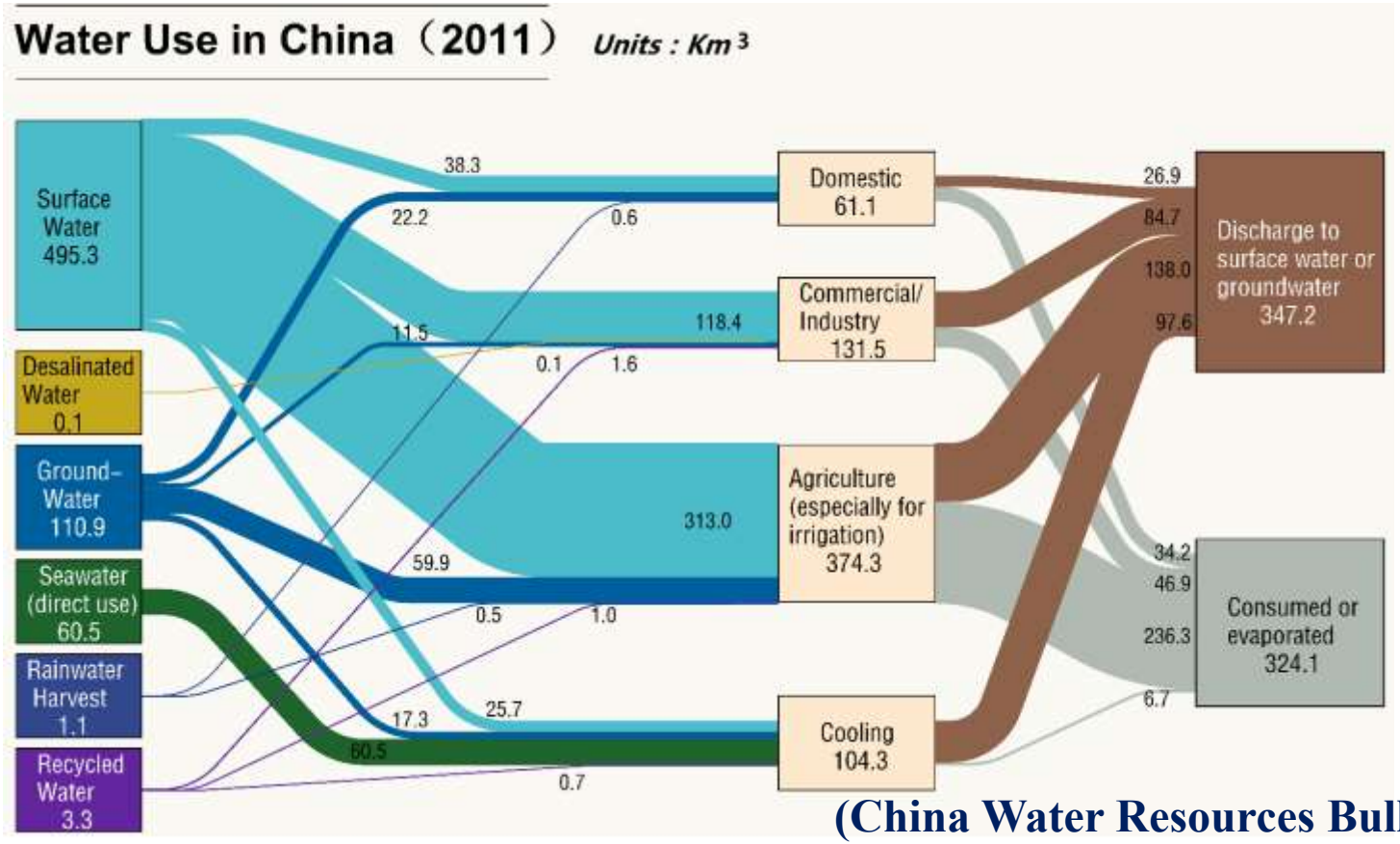
China's Water Resources

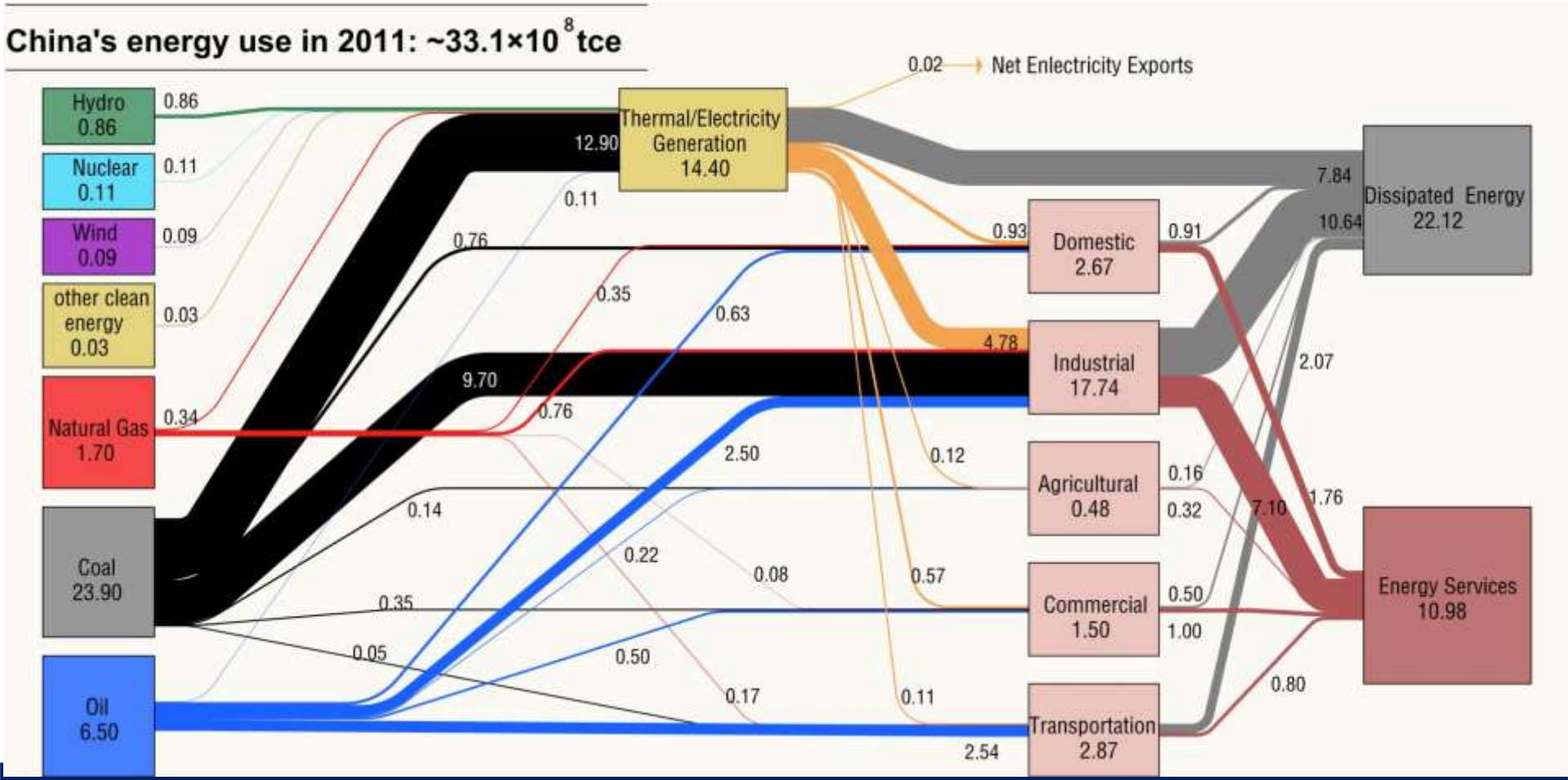
- Total freshwater use in 2011: 610 billion m^3, among which 81% from surface water, 18% from groundwater and 1% from others
- 61% for agricultural water use, 22% for industrial use, 10% for domestic water use and 7% for cooling



(China Water Resources Bulletin, 2012)

China's Energy Use

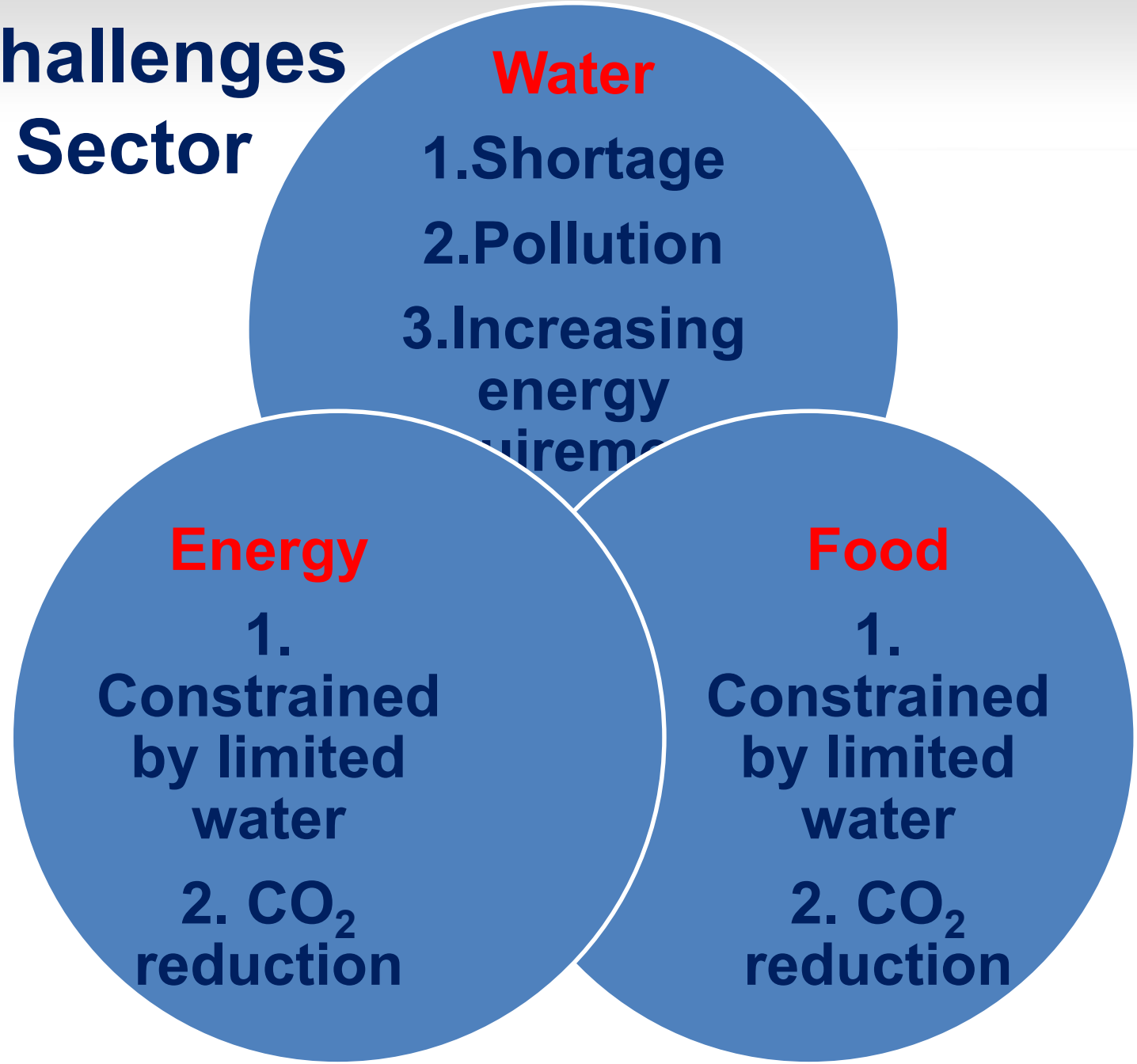
- The **largest energy consumer and producer** in the world;
- The overall energy using efficiency is **33%**, and energy intensity is ~**3 times** of the US.



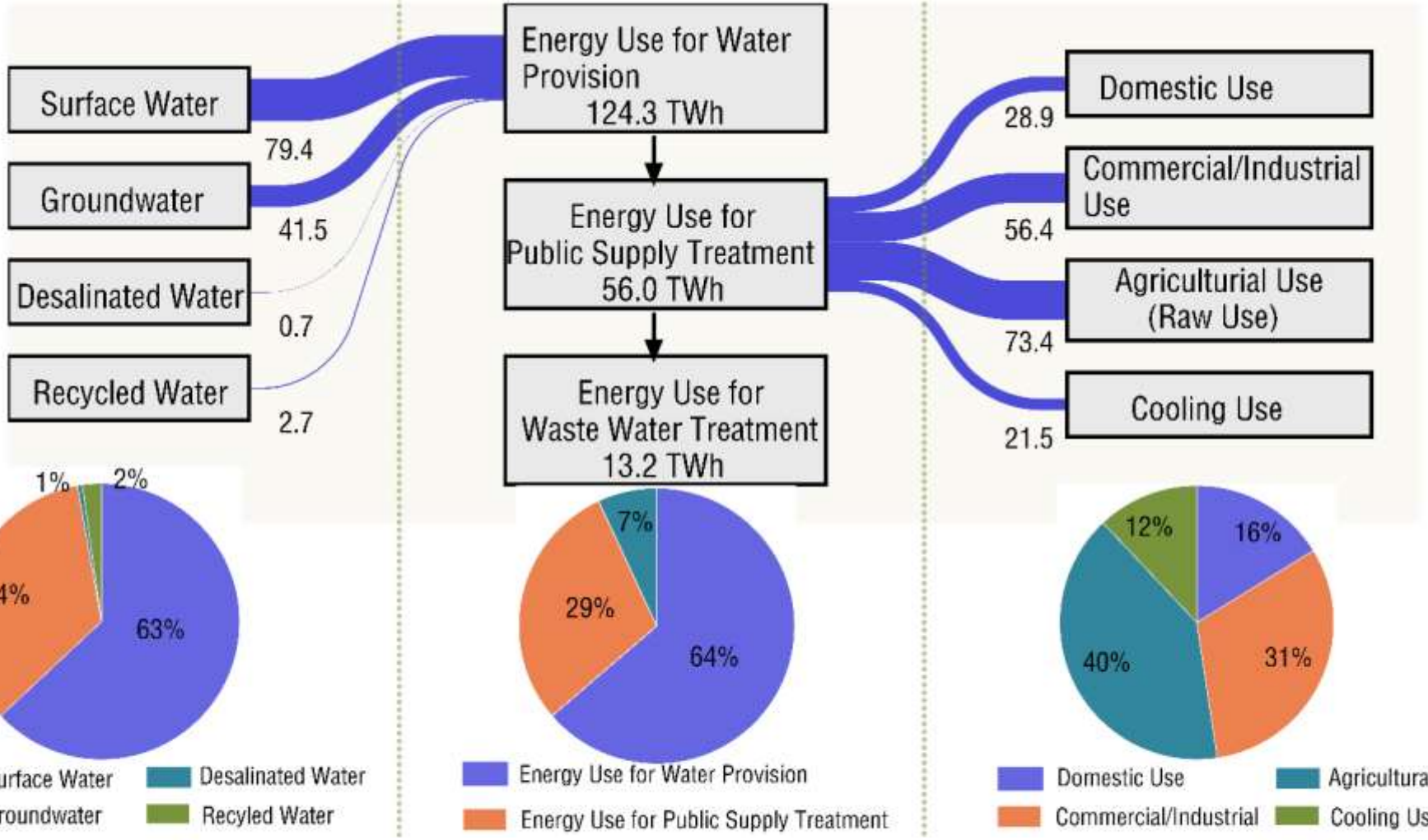
China's Food Security

- By 2020, total grain demand will reach 0.6 billion tons, with the deficit around 40-50million tons;
- With economic development and urbanization, the dietary pattern of urban residents will also change accordingly, with the demand of other agricultural products increasing each year;
- North China exports annually more than 50 billion m^3 of virtual water with food to South China, while real water transfers go in the opposite direction;
- Grain production per unit water in China is 1/3 of that in the developed countries.

Major Challenges of Each Sector



Energy Use in the Water Sector of China



Energy Consumption Related to Different Water Sources Supply

193.5 TWh, 4% of total national electricity consumption

sumption For Different Water ding water supply and treatment)

PKU team, 2015

Energy Use in Each Step of Water Provision and Treatment of China

Unit (TWh)	Energy use for water extraction				Energy use for public supply treatment	Energy use for wastewater treatment
	SW	GW	Desa	Recy.		
Domestic sector	6.14	8.31	-	-	14.5	8.58
Industrial sector	23.1	10.77	0.7	1.88	41.5	4.62
Agri. sector	50.2	22.4	-	0.82	-	-

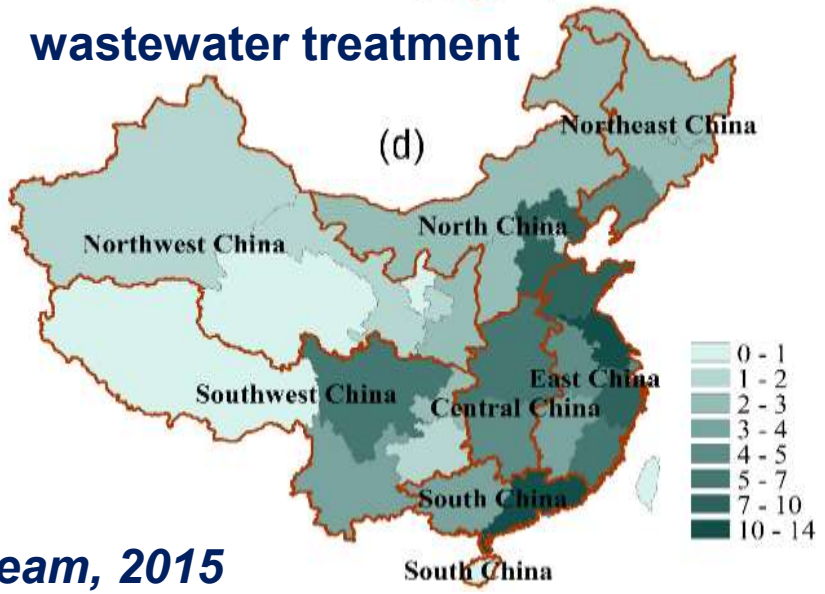
Provincial Distributions of Energy Use (10^8 kWh)

groundwater extraction

desalination

water recycling

wastewater treatment



PKU team, 2015

Policy Implications

- **Shifting water supply structure (SNWT…)**
  - energy intensity of water supply varies significantly depending on the water sources
- **Water conservation strategies (3 Red-lines)**
  - water savings translate into energy savings, unless water savings are achieved through more energy-intensive technologies
- **Improving the technical and equipment level in water and energy fields**
  - room for efficiency improvement is large both in water and energy sectors, especially in high water/energy intensity ones

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Multi-stakeholder collaboration
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Thank you!