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WORLD RESOURCES INSTITUTE

Global Water Partnership China

World Water Week 2017 in Stockholm

CIRCULAR ECONOMY CITIES: TRANSFORMING CHINA AND INDIA'S URBAN WASTEWATER

Time: 14:00-15:30, August 30, 2017
Venue : Nl Music Hall

Steven Downey

Head of Communications
Global Water Partnership
Email: steven.downey@gwp.org

Steven Downey is Head of Communications at GWP global secretariat, a post he has held since June 2008. He has more than 20 years of experience in development work and communications and has a M.A. in Communications.

GWP's Communications Unit supports the implementation of GWP's strategic goals, along with 13 GWP regional communications officers.

Dr. Yunzhong Jiang

Secretary General GWP China
Regional Water Partnership
Email: larkking@sina.com

Joining in GWP China Regional Secretariat in 2004, Dr. Yunzhong Jiang has engaged in technology and strategy development. He was appointed as Secretary General of GWP China Region in March 2016.

Dr. Jiang's profession focuses on water resources and planning, water information technology and system development. He has developed 8 joint motographs, 100+ research papers and 20+ software copyrights.

RECYCLING URBAN WASTEWATER IN CHINA

PATH TO THE CIRCULAR ECONOMY

Global Water Partnership China
Dr. Yunzhong JIANG, Secretary General
Stockholm, Sweden

CONTENTS

- Background in China
- Sewage water discharge and treatment
- Recycled water utilization
- Challenge

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1

Background

1.1 Shortage of Water Resources

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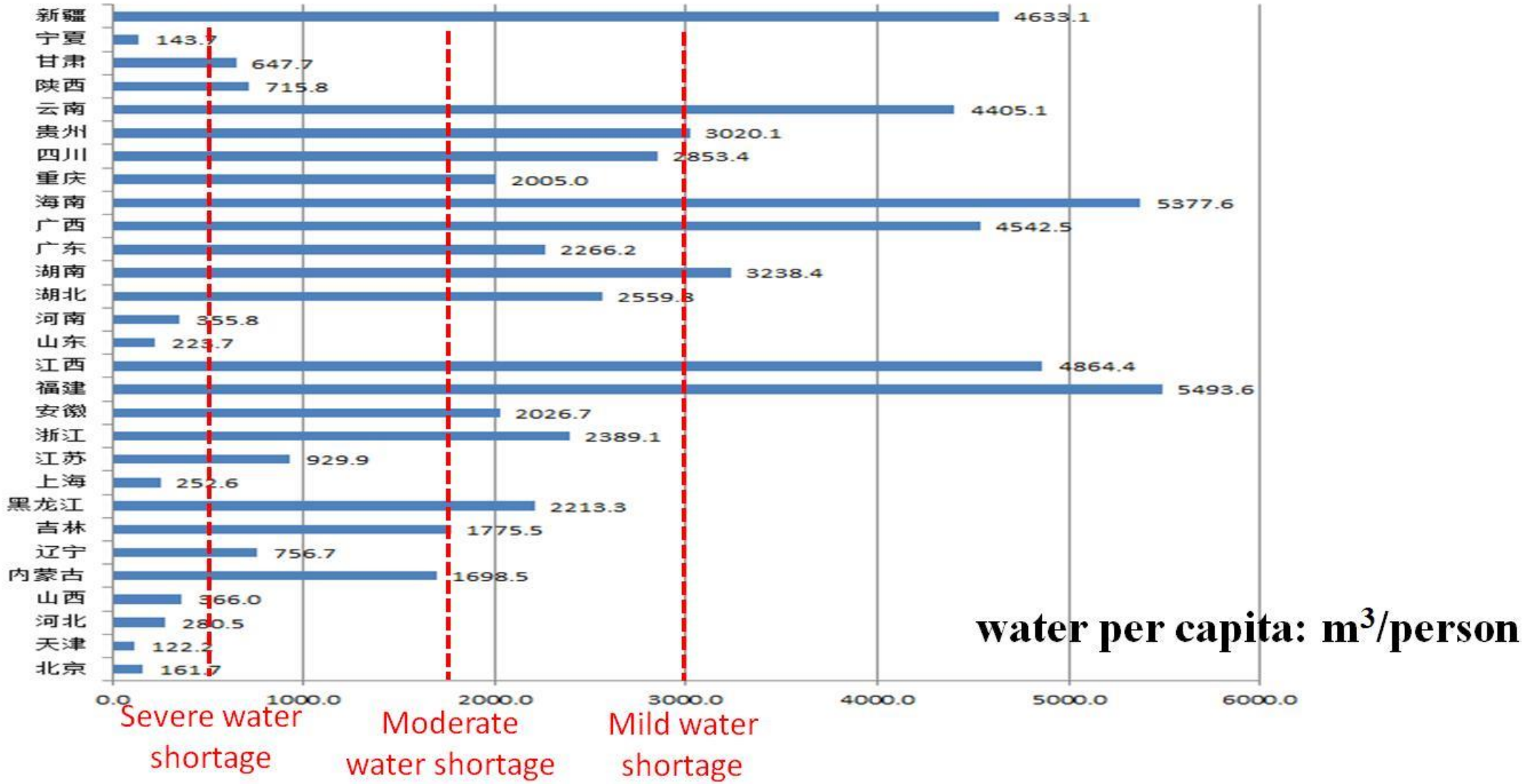
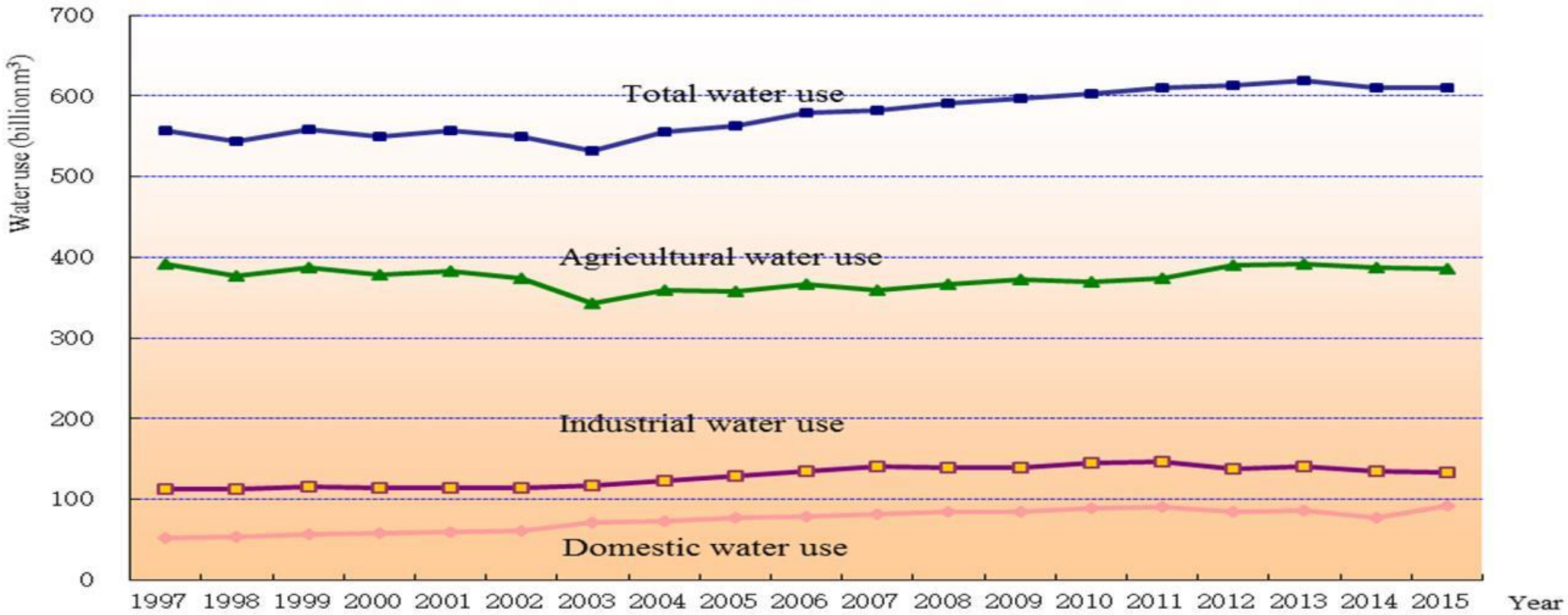
Prov.



water per capita: m^3/person

1.2 Increasing Water Use



Variation of water use in China, 1997~2015

1.3 Huge Waster Water Discharge

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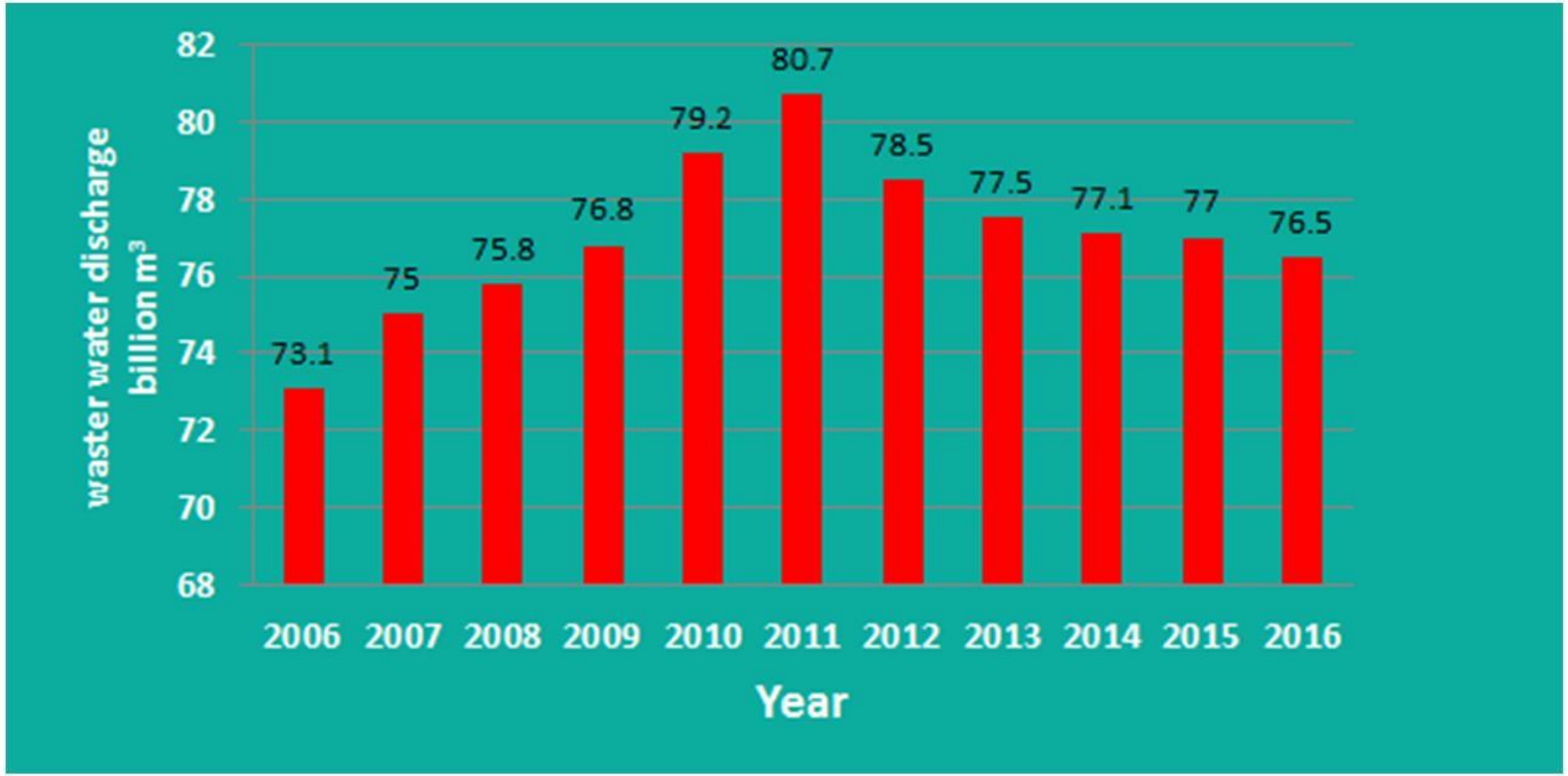
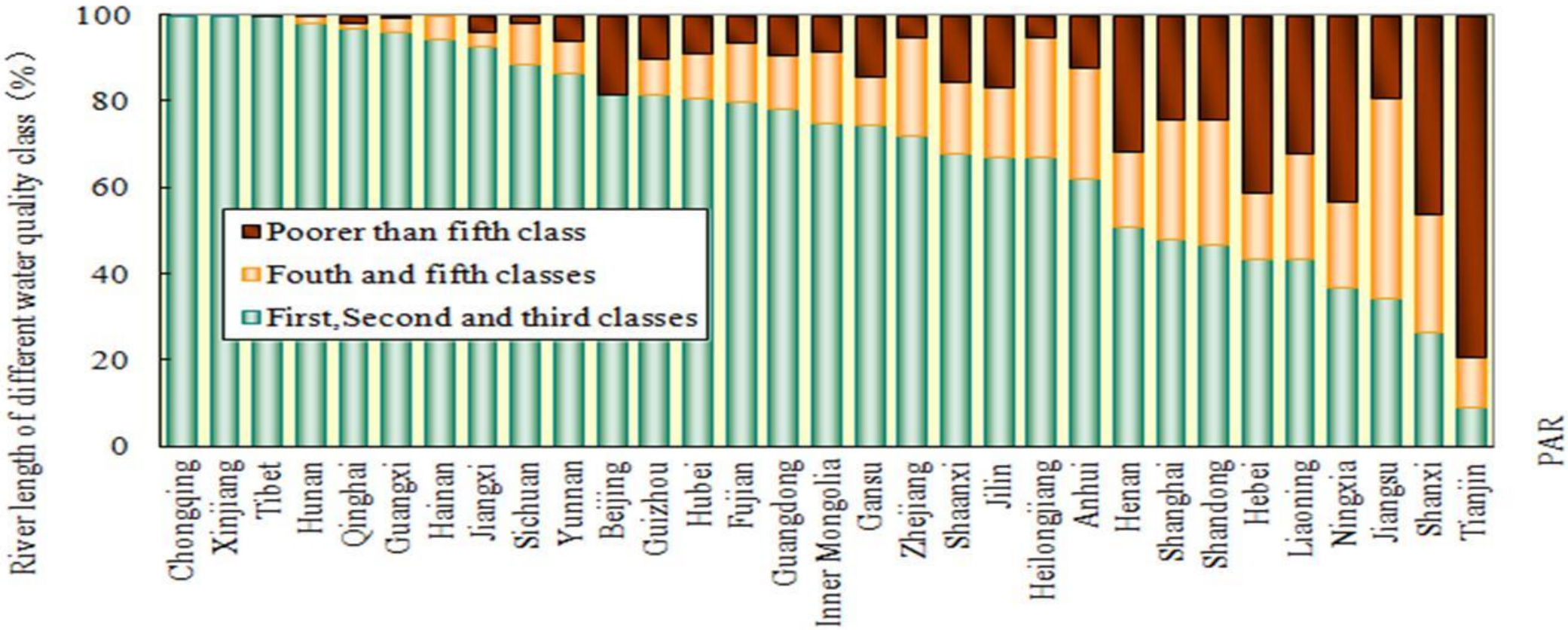


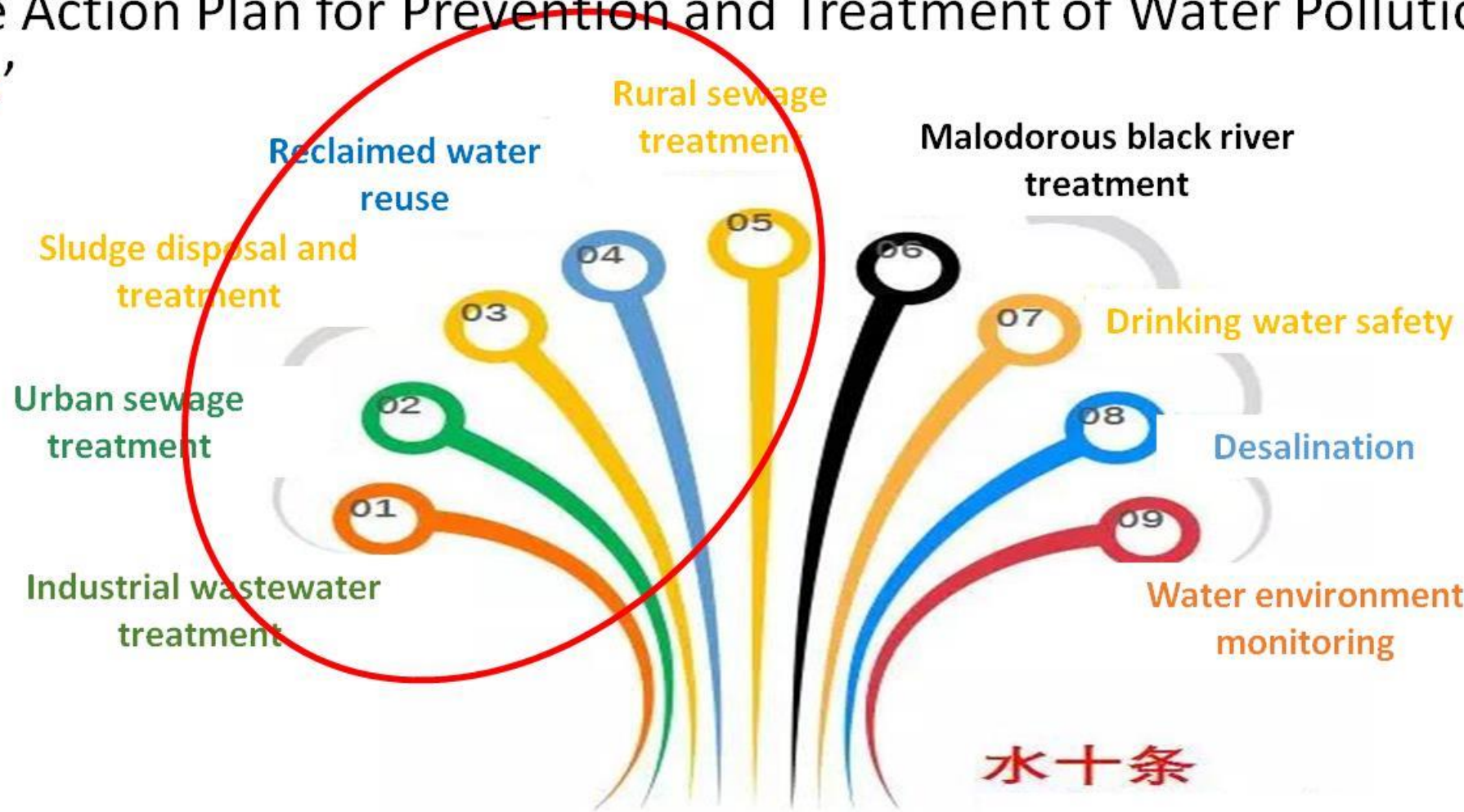
1.4 Severe river water quality



Percentages of river length of different water quality classes in total evaluated river length by PAR, 2015.

1.5 National Policy

- The Most Stringent Water Management System — 'THREE RED LINES'
- The Action Plan for Prevention and Treatment of Water Pollution— 'Water Ten'



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2

Current status of sewage water discharge and treatment

2.1 Number of Sewage Water Treatment Plants

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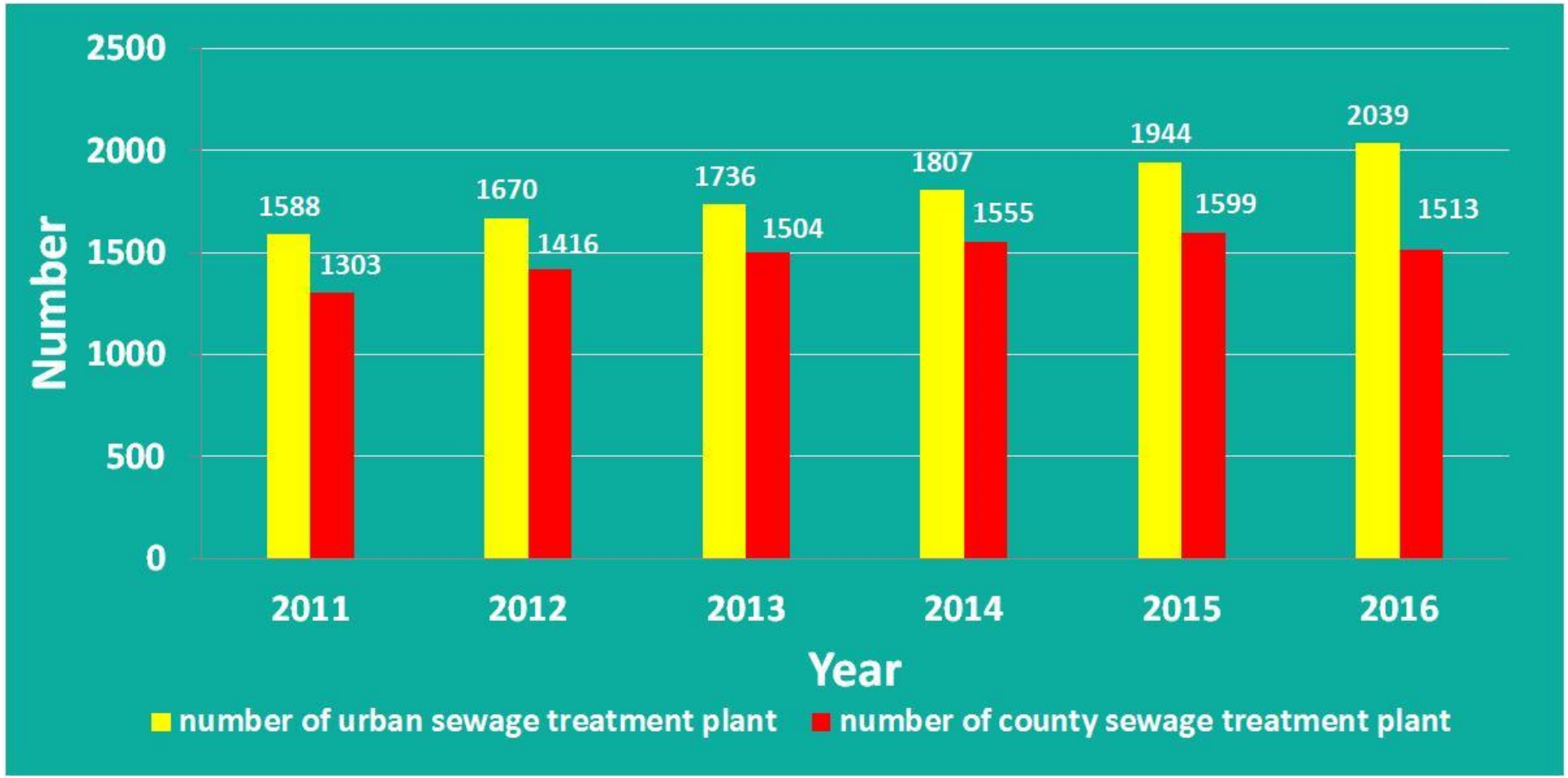
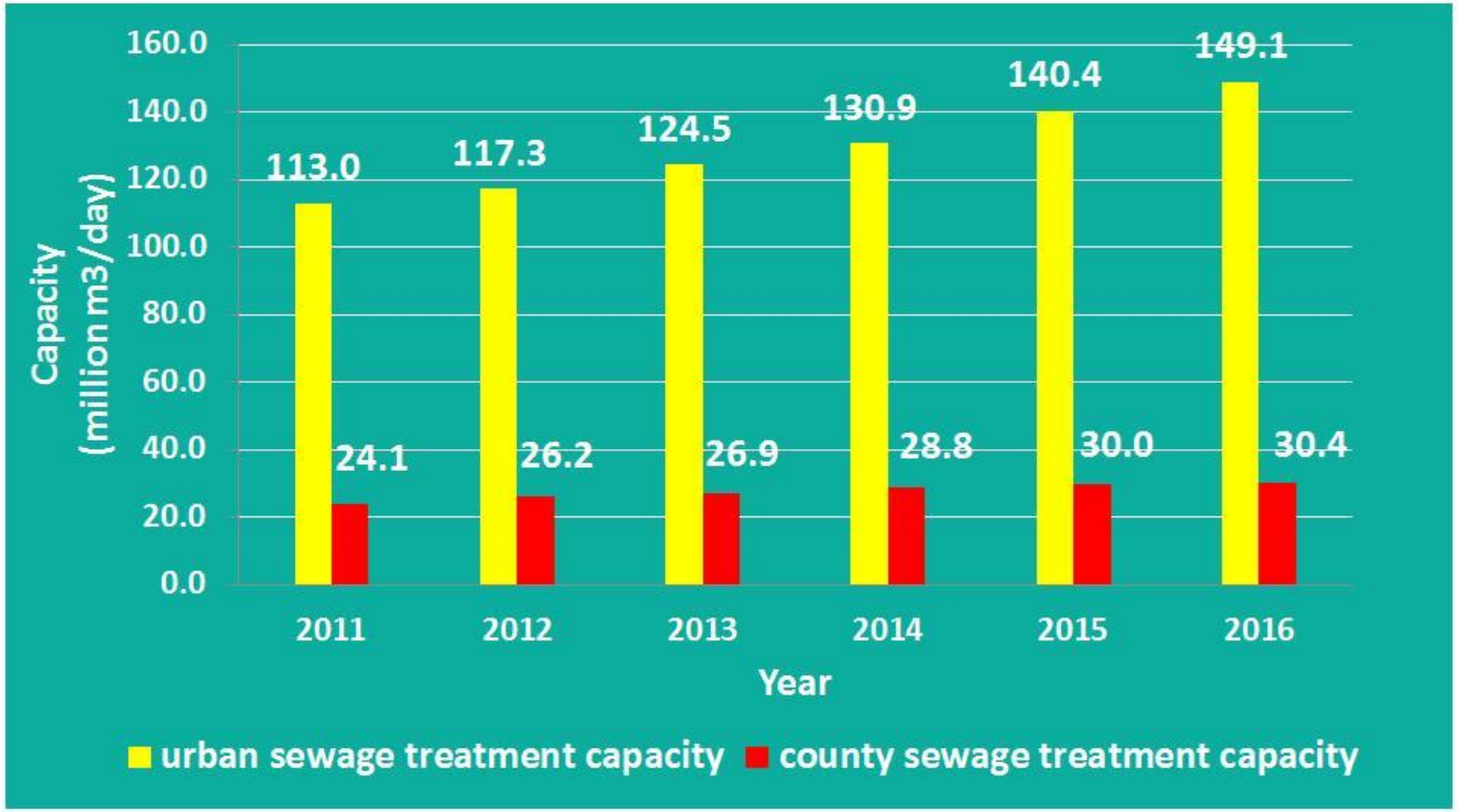
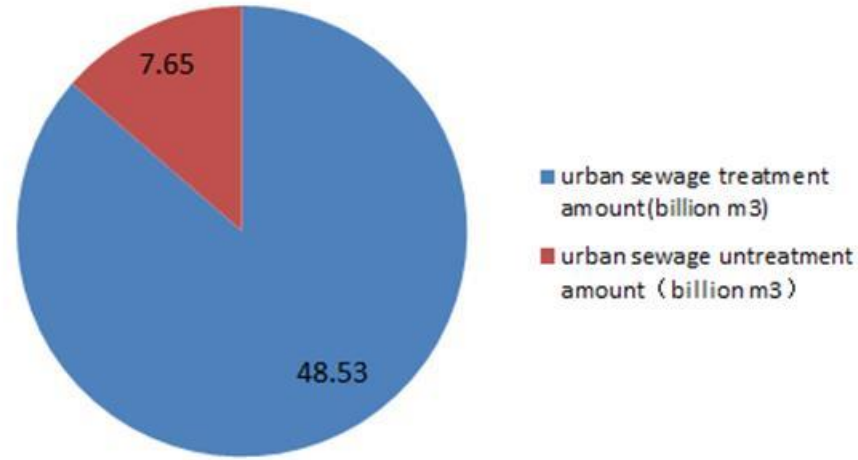


Since 2011 to 2016, the number of urban sewage treatment plant is increased 28% , from 1588 to 2039. Meanwhile, the number of county also grew 16%, from 1303 to 1513.

2.2 Capacity of Sewage Water Treatment

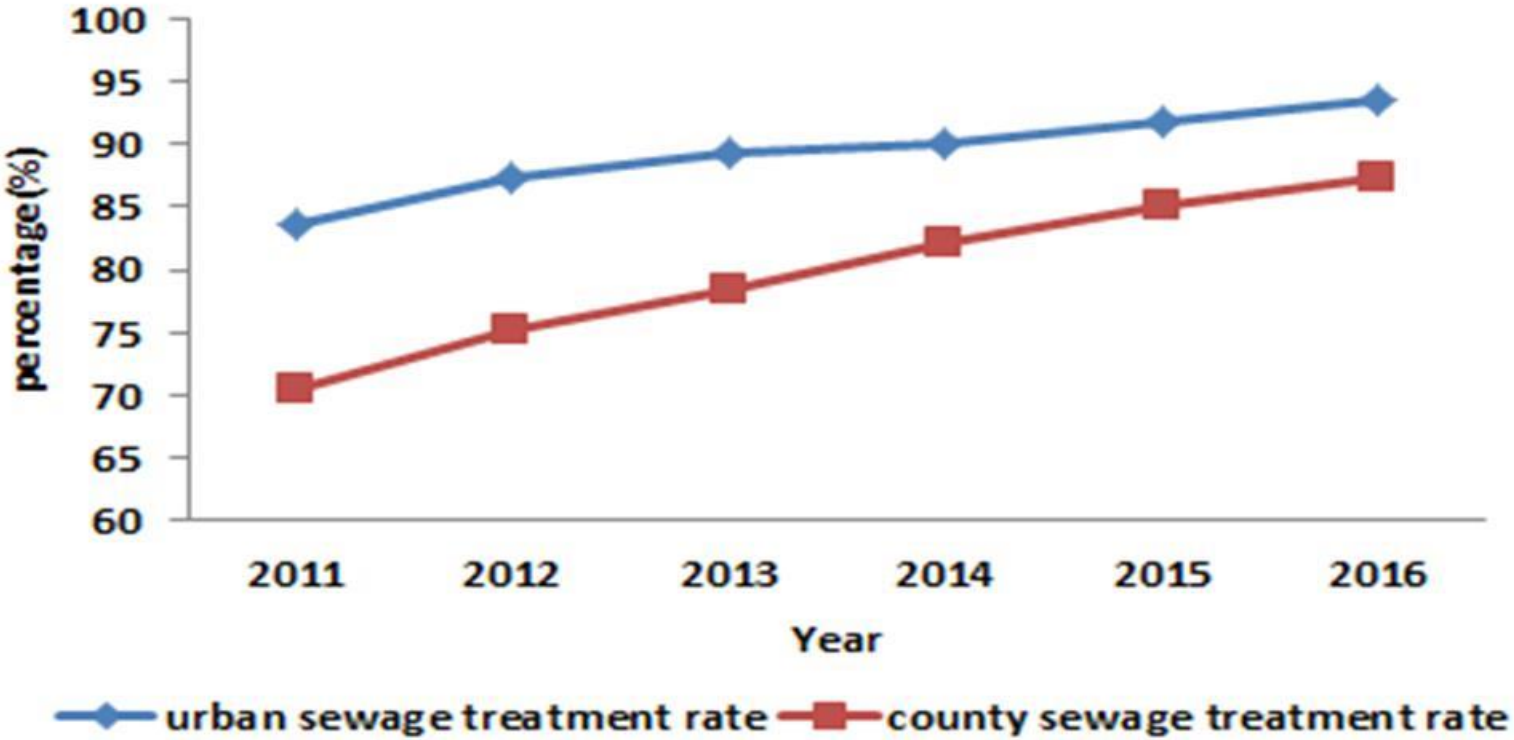




Sewage Water Treatment, 2016

Last Six years, the capacity of urban sewage treatment is steadily increased from 113 to 149 million m^3/day in a 6% average growth rate. Meanwhile, there was a growth from 24 to 30 million m^3/day in a 5% average growth rate in county.

2.3 Sewage Water Treatment Rate



The urban and county sewage treatment rate are increased 10% and 17% respectively last five years. The urban rate grew from 84% to 93%, and the county rate rose from 70% to 87%.

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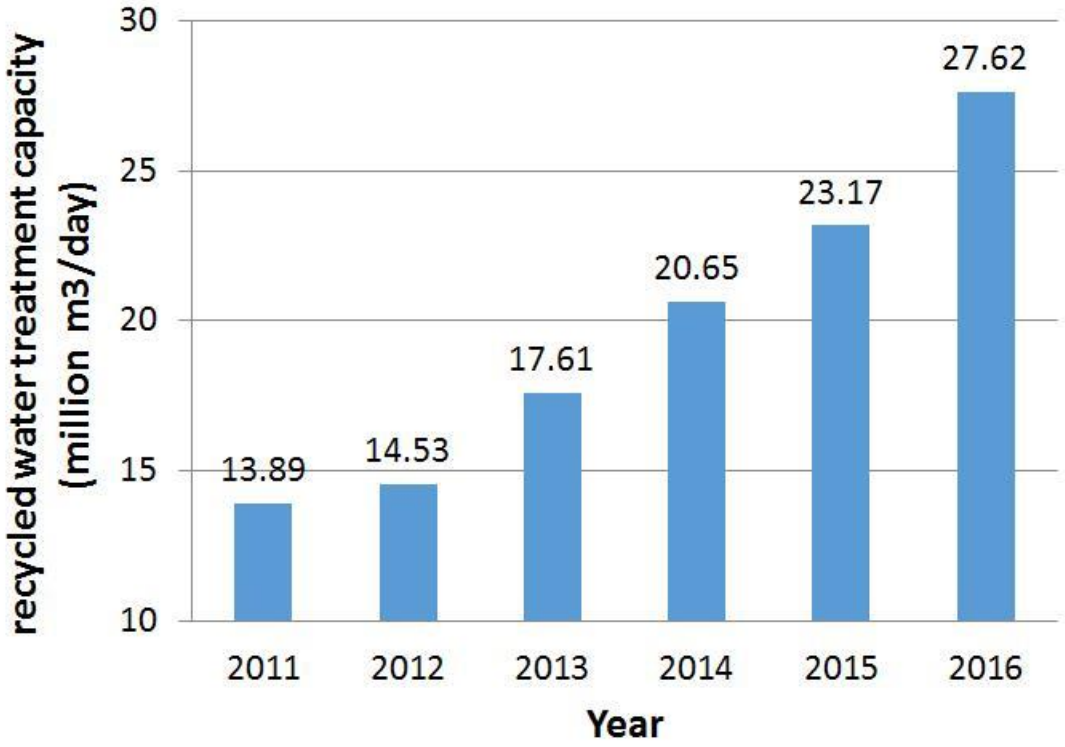
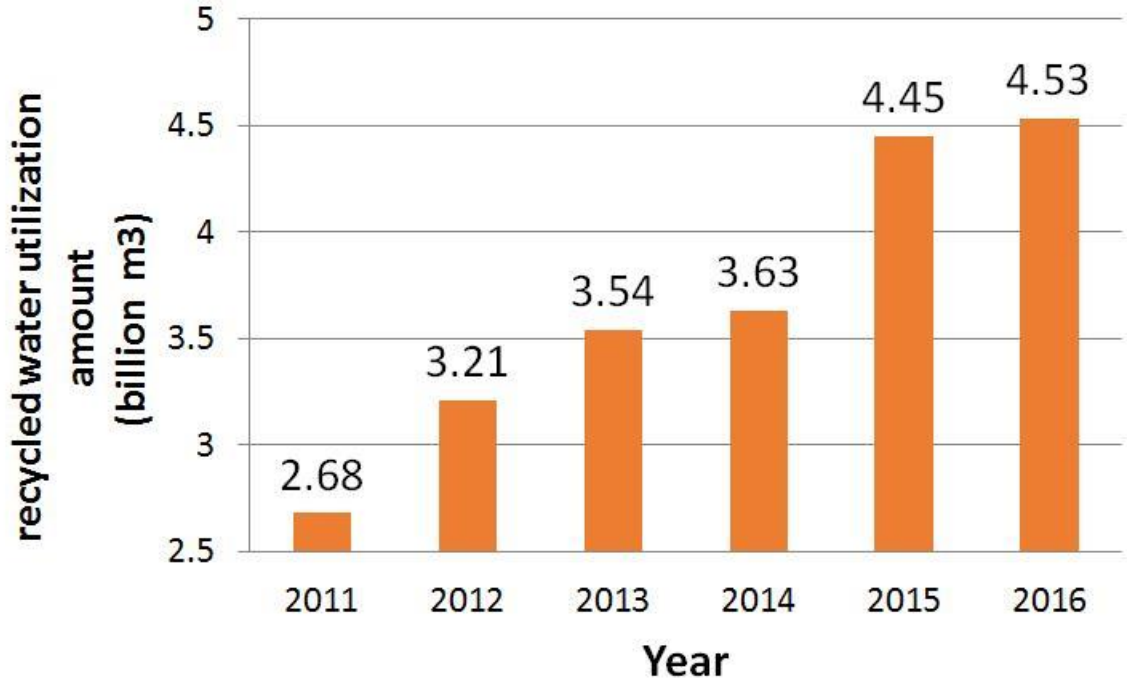
3

Current status of recycled water utilization

3.1 Recycled Water Treatment

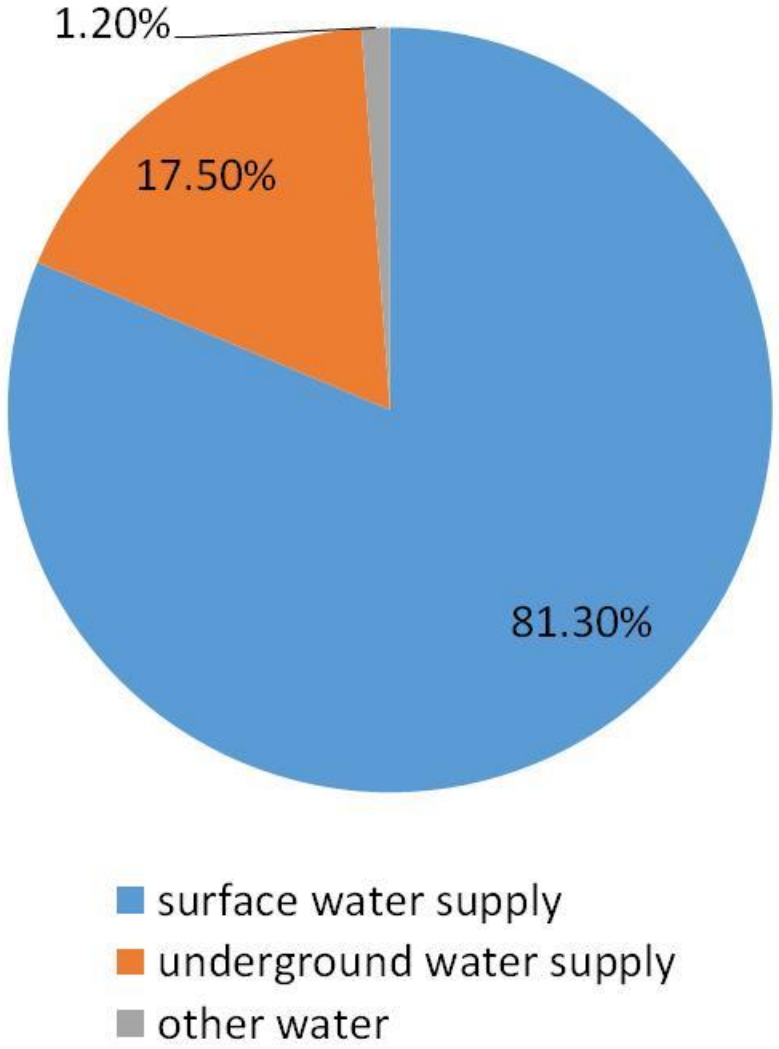




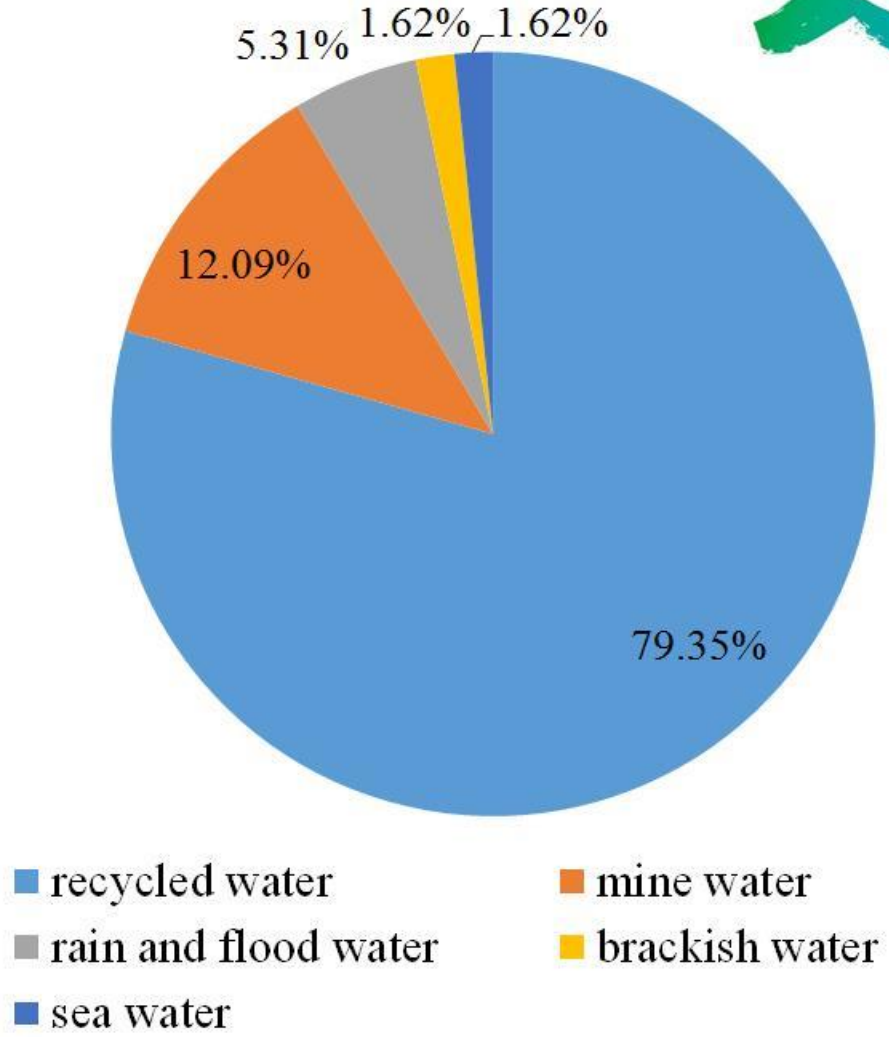
Since 2011 to 2016, the capacity of urban recycled water treatment is steadily increased from 14 to 28 million m^3/day in a 15% average growth rate, while capacity more than double.

Meanwhile, the amount of recycled water utilization is also increased more than double, from 27 to 45 billion m^3 /year in a 11% average growth rate.

3.2 Recycled Water Utilization

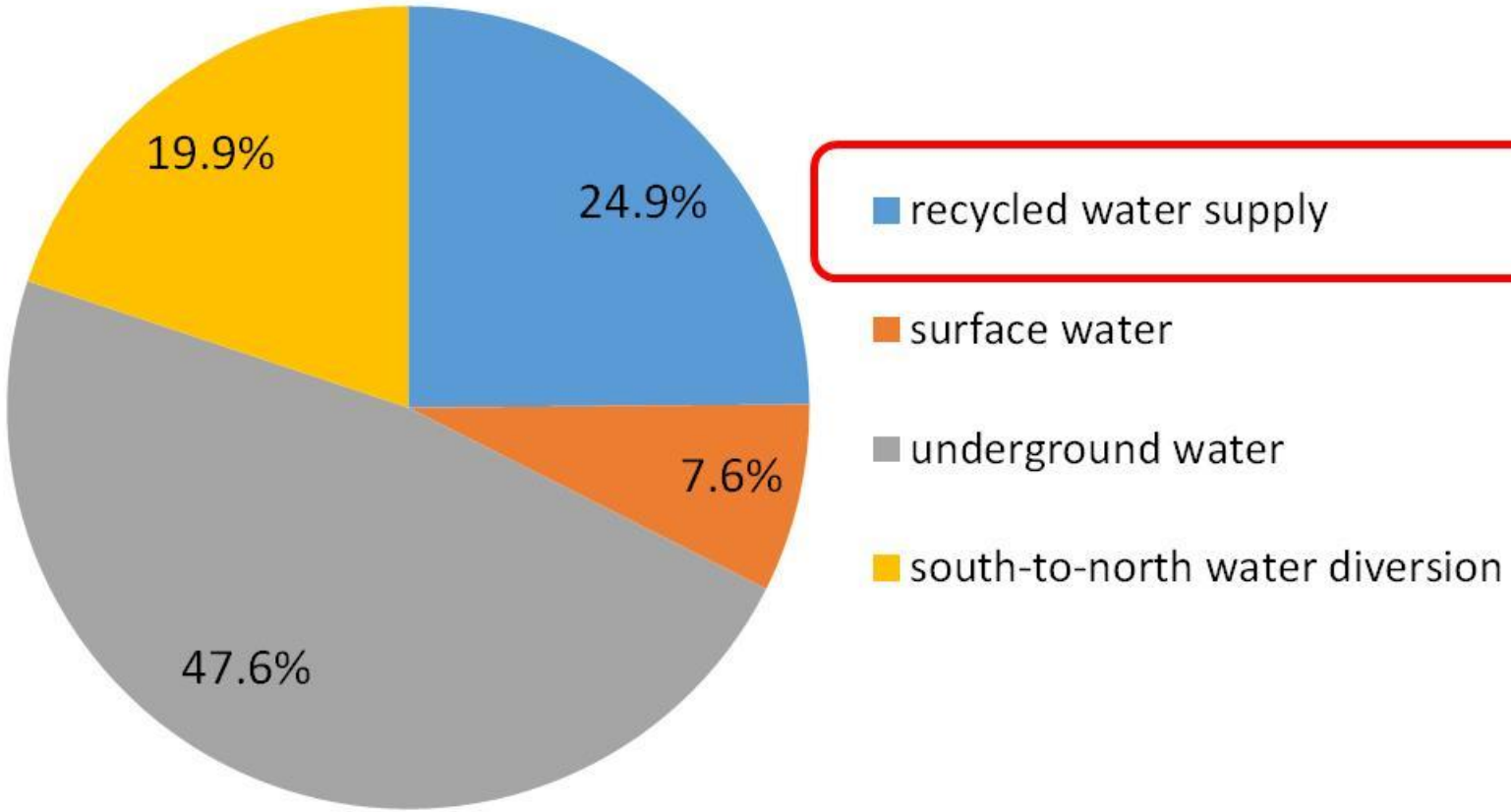


The proportion of total water supply in 2016



The proportion of other water supply in 2016

3.3 EXAMPLE-Beijing

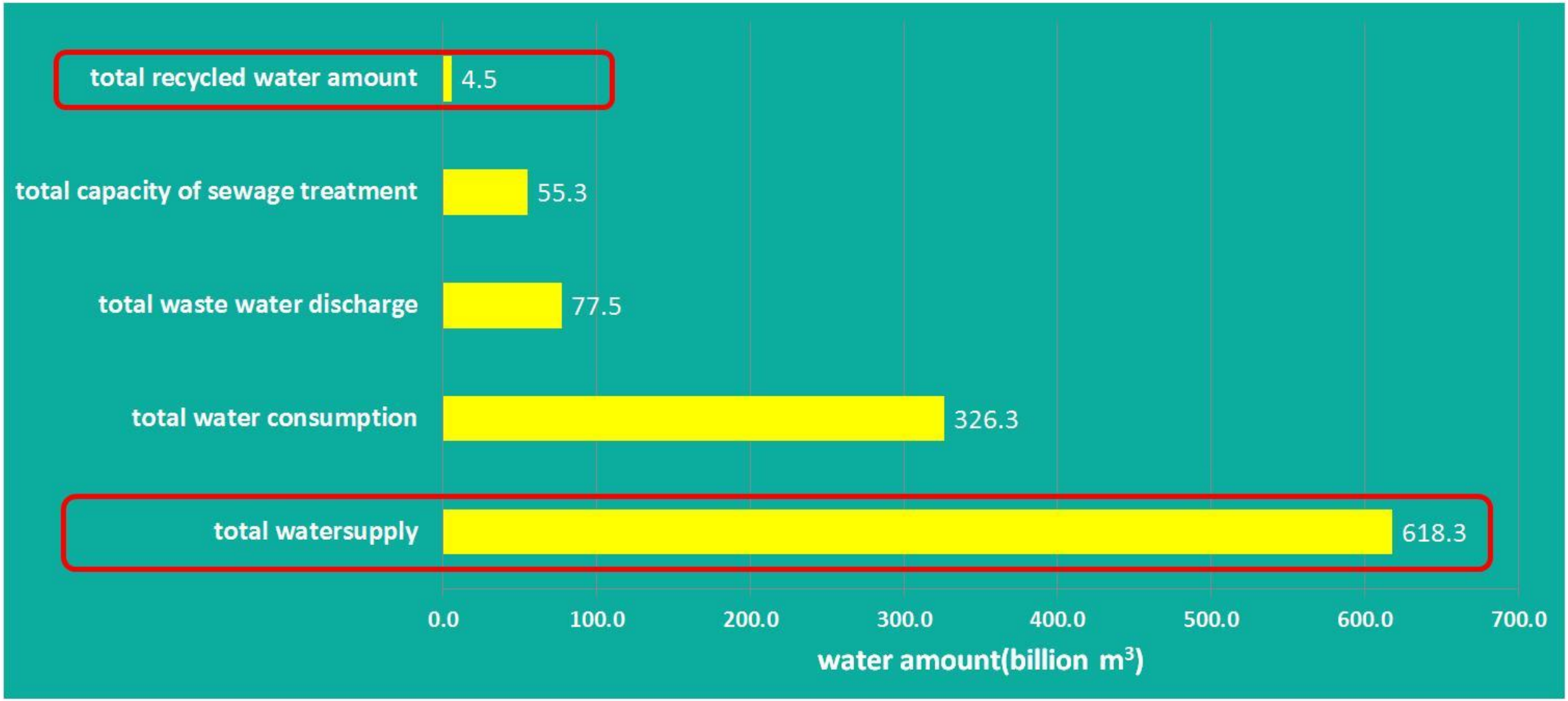


The total water supply amount is 3.82 billion m^3, among that, the recycled water supply amount is 0.95 billion ton, nearly 25% of total water supply, which can alleviate water shortage effectively in Beijing.

3.3 EXAMPLE-Beijing

Beijing Huaifang recycling plant is the largest *underground* recycling plant in Asia.

3.7 Summary


total recycled water amount
4.5
total capacity of sewage treatment
55.3
total waste water discharge
77.5
total water consumption
326.3
total watersupply
618.3
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
water amount(billion m³)

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4

Challenge

4.1 POLICIES AND REGULATIONS

- The market policy for the construction and utilization of renewable water facilities is lacking.
- The price of tap water and recycled water is unreasonable, which is always higher than normal water resources.

4.2 Management

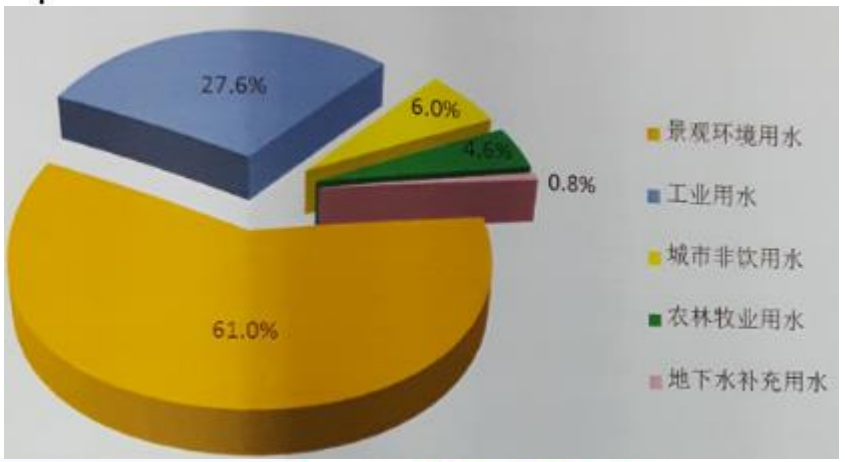
- The particular recycled water utilization planning is lacking.
- Water supply and drainage belong to different management organizations, which is difficult for water recycled.

4.3 Engineering facilities

- The sewage systems is not enough, which restricted the sewage recycling.

4.4 Water quality standards

- The water quality standard for recycled water is low, which just meet the agricultural irrigation , car wash and flushing requirements.



Water Environmental Standard

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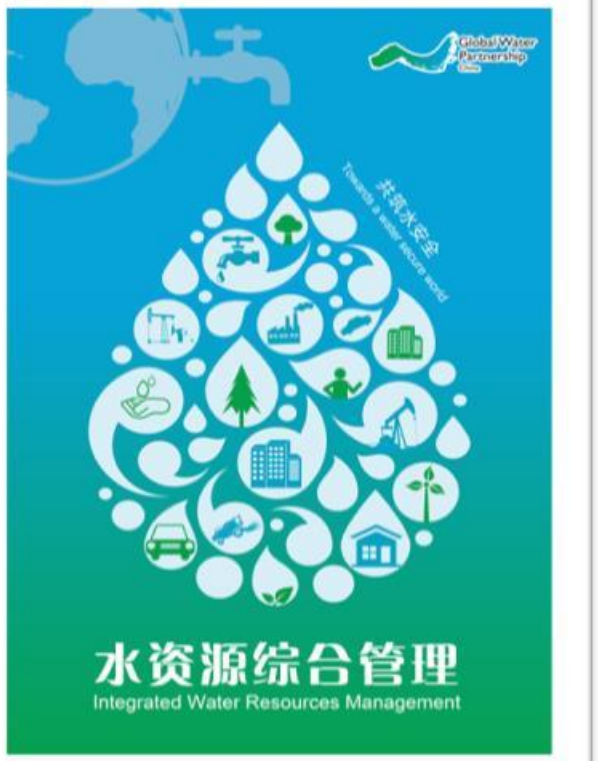
Comparing with the American national standard, there are few items in Chinese national standard.

- ***American national standard(ANS)***: Clean Water Act(CWA)
  THE NRWQC 2002 includes:
  - Criteria for priority toxic pollutants: ***120 items***
  - Criteria for non-priority pollutants: ***45 items***
  - Criteria for organoleptic (taste and odor) effects: ***23 items***
- ***Chinese national standard(CNS):*** Environmental Quality Standards for Surface Water(GB 3838-2002) includes:
  - Fundamental parameters: ***24 items***
  - Supplemental parameters for source water for community water supply: ***5 items***
  - Specific parameters for source water for community water supply: ***80 items***



谢谢！

Thanks for your attention.

Yue Zhang

Director General
Department of Water Resources
China Civil Engineering Society

Prof. Yue Zhang is the Director General of the Department of Water Resources of the China Civil Engineering Society. He was the Director General of the Urban Construction Department and the Director General of the Urban Water Management Office , Ministry of Housing and Urban-Rural Development.

Prof. Zhang has long been engaged in research, design and management of the urban water, wastewater and solid management. He took lead on the national policies on urban water, wastewater and solid waste policies and manangeed national science and technology projects.

URBAN WASTEWATER TREATMENT AND RESOURCES RECOVERY IN CHINA

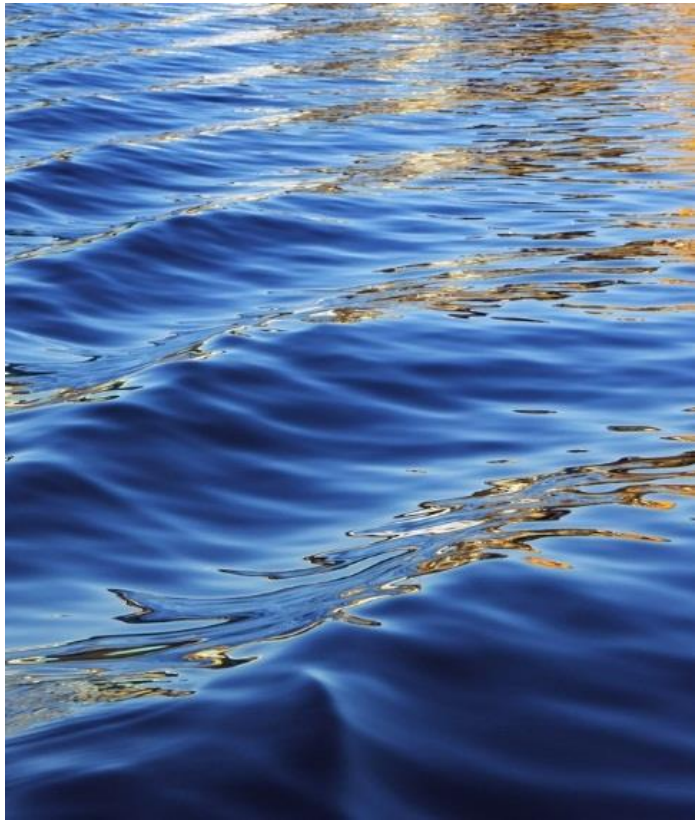
Prof. Yue ZHANG

Director General, Department of Water Resources of the China Civil Engineering Society

30 August 2017

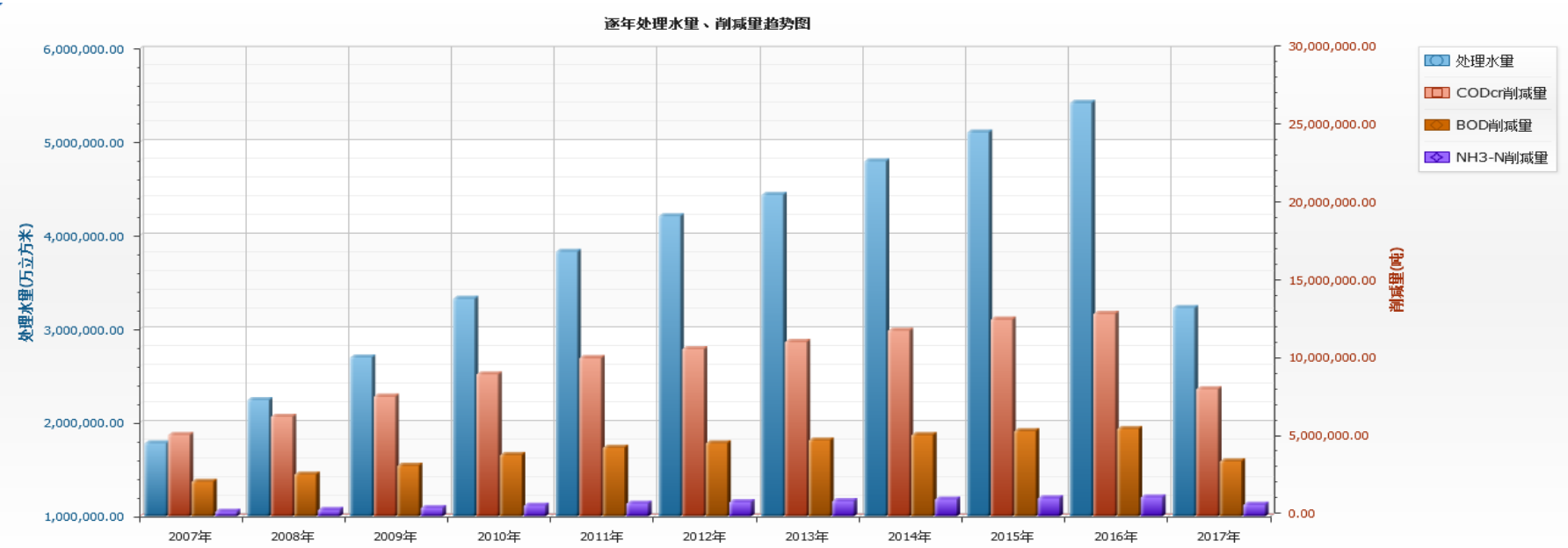
2017 World Water Week @ Stockholm

Wastewater: New Water Resources




全国城镇污水处理管理信息系统
China Wastewater Treatment Management System
用户代码
用户密码
验证码
6114
换一张
确认
帮助
小城镇项目用户手册下载
业务主管: 住房和城乡建设部城市建设司
业务咨询电话: 010-58934757
业务咨询邮箱: chengshui@mail.cin.gov.cn
技术支持: 住房和城乡建设部信息中心
技术咨询电话: 010-58934446
业务支持邮箱: xtc@mail.cin.gov.cn

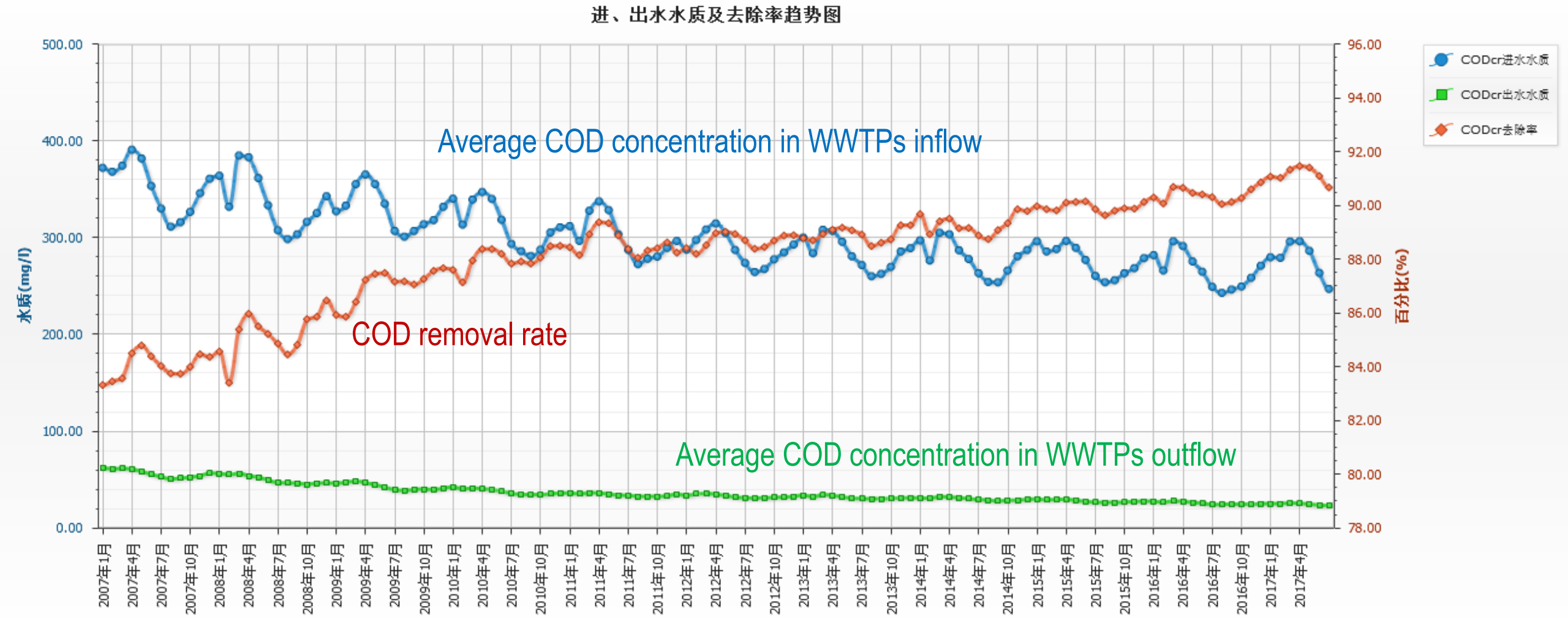
Wastewater production and pollutants reduction in China



- Urban wastewater treatment capacity increased rapidly, exceeding 180 million m^3/d by Apr 2017.
- In 2016, 54bn m^3 wastewater treated

序号	年份	处理能力(万立方米/日)		处理水量(万立方米)		COD		BOD		SS		NH3-N		TN		TP	
		日处理能力	增长(%)	年处理量	增长(%)	削减量(吨)	增长(%)	削减量(吨)	增长(%)	削减量(吨)	增长(%)	削减量(吨)	增长(%)	削减量(吨)	增长(%)	削减量(吨)	增长(%)
1	2007年	7683	---	1784301	---	5232843	---	2236131	---	3320190	---	313394	---	206966	---	55315	---
2	2008年	9174	19.41	2245225	25.83	6404485	22.39	2701175	20.80	4195243	26.36	420684	34.23	291381	40.79	65688	18.75
3	2009年	10457	13.98	2701781	20.33	7701109	20.25	3261408	20.74	4945612	17.89	545151	29.59	416506	42.94	83490	27.10
4	2010年	12526	19.78	3328848	23.21	9129608	18.55	3940690	20.83	6010145	21.52	700321	28.46	575599	38.20	104063	24.64
5	2011年	13679	9.21	3830239	15.06	10165491	11.35	4416703	12.08	6757284	12.43	826196	17.97	702725	22.09	122252	17.48
6	2012年	14284	4.43	4211644	9.96	10741511	5.67	4706255	6.56	7368099	9.04	919581	11.30	810556	15.34	130822	7.01
7	2013年	14862	4.05	4439881	5.42	11201655	4.28	4890474	3.91	7748043	5.16	985676	7.19	883797	9.04	139346	6.52
8	2014年	16038	7.91	4799239	8.09	11930802	6.51	5231574	6.97	8345688	7.71	1096162	11.21	1007781	14.03	151684	8.85
9	2015年	16612	3.58	5107977	6.43	12641273	5.95	5475737	4.67	8731354	4.62	1176334	7.31	1120960	11.23	166842	9.99
10	2016年	17620	6.07	5424033	6.19	13006938	2.89	5619610	2.63	9193228	5.29	1233608	4.87	1197238	6.80	178416	6.94
11	2017年 前7月	18239	5.17	3230345	3.61	8173141	5.74	3544841	6.53	5796916	7.16	757395	5.73	752873	7.27	114254	9.09

COD Reduction in Municipal Wastewater in China



Wastewater Reuse in China

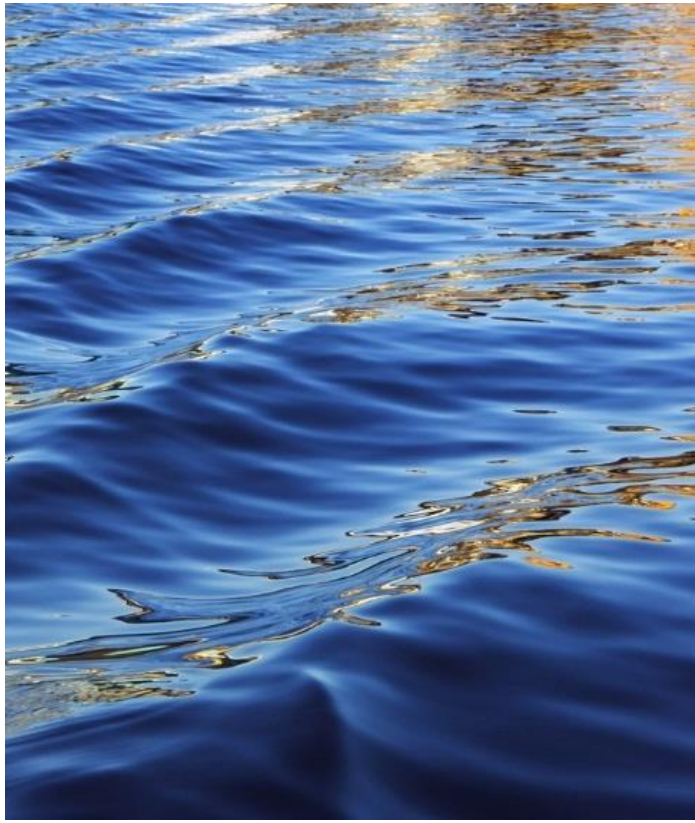
Reclaimed wastewater for city greening and landscaping

Reclaimed wastewater for city rivers recharge

Reclaimed wastewater for road cleaning

33

Sludge: Hidden Energy Sources



Sludge Production and Disposal in China

- More than 30 million tons sludge (with 80% moisture content) was produced annually

- Sludge dilemma: GHG (methane) emission vs. wasted energy (methane)

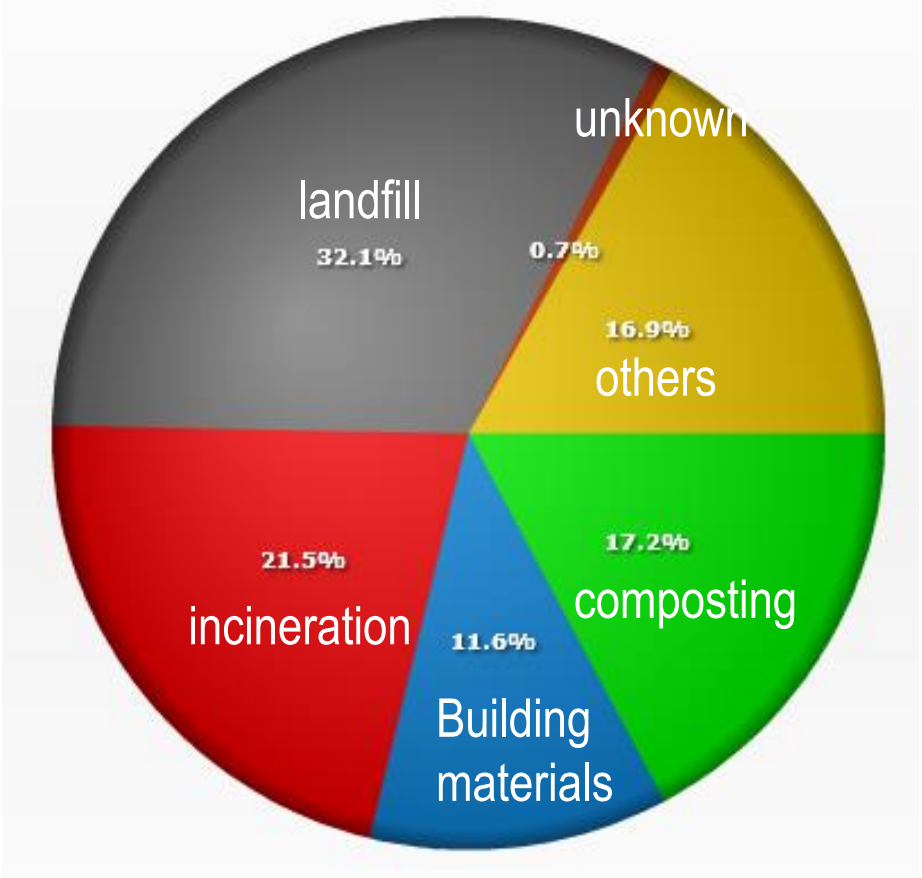


Fig. Main Methods of Sludge Treatment in China

Sludge Disposal in China: A Case of Methane Capture from AD

Thermal Hydrolysis (THP)+Anaerobic Digestion (AD)

to produce more methane

- THP unit improves the fluidity of sludge during the AD process
- More biogas produced
- THP unit kills bacteria and improve quality of digested sludge
- THP saves land and improve treatment capacity

Sludge Disposal in China: A Case of Methane Capture from AD

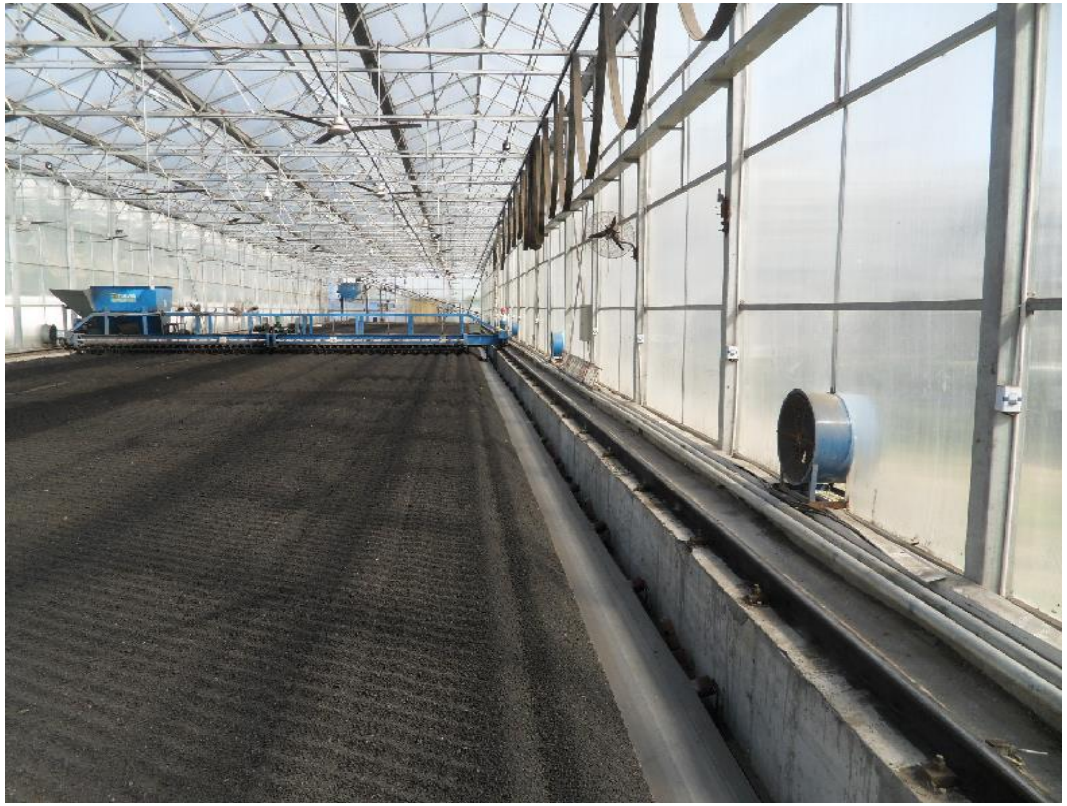
Compressed Natural Gas (CNG) for fuel cars

- Clean bioenergy
- Replace fossil fuel
- Reduce environment pollution

Sludge Disposal in China: A Case of Methane Capture from AD

Biochar soil

- Soil enhancement

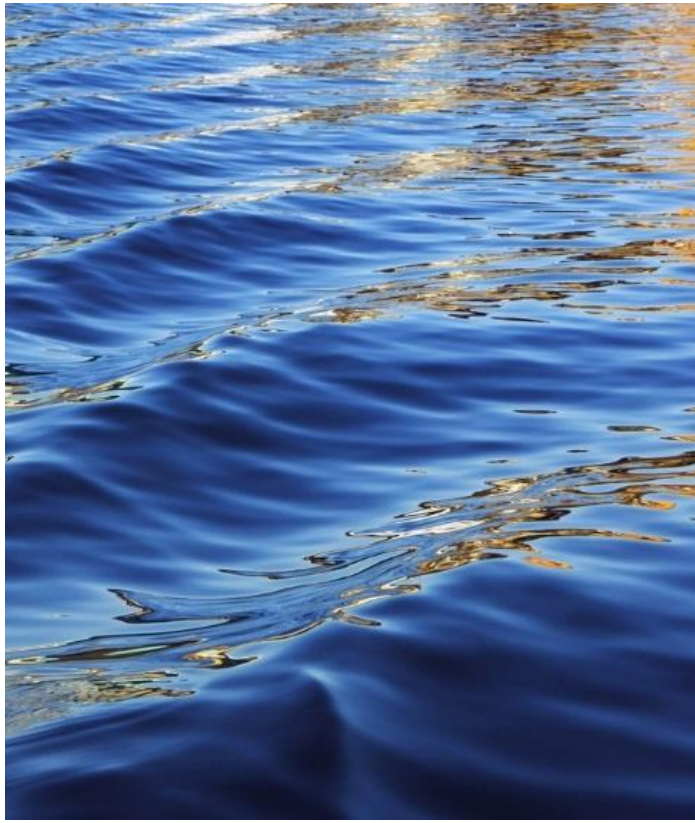


Sludge Disposal in China: A Case of Methane Capture from AD

Container Forest

- Cultivating samplings – urban greening and landscaping
- New green industry

Chinese Experiences Learnt



Clarifying Government Responsibilities

- Wastewater is a public sector and government should take the full responsibilities
- Water and wastewater treatment as part of governments' performance review
- Legislation for water and wastewater
- Economic incentives and policies

Implementing Charging Schemes

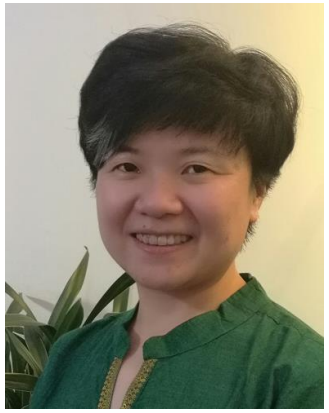
- Learning from other countries and building up China's water/wastewater charging/pricing system (with supports from World Bank, Asian Development Bank, etc.)
- Universally charging water use and wastewater treatment
- Co-collecting system for water supply and wastewater
- Central government proposed the minimum rate

Opening Market

- Open the market to private sector
- PPP models to address the funding gaps and bring in competition mechanism
- Changing governments' role from executive agency to market regulators

Future Forward: Need More Innovations

Thank you!



Dr. Lijin Zhong

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Dr. Zhong Lijin is heading the water team in WRI China Office to carry out the water-energy nexus and water quality management projects in China.

Dr. Zhong has over 15 years' experiences in environmental engineering, planning and management, environmental impact assessment and environmental policy. She has been focused on water sectors since 2003.

Vittal Boggaram

Senior Manager, Water Program
World Resources Institute India
Email: vittal.boggaram@wri.org

Vittal Boggaram is the lead person for developing the urban water program in India. His work includes identifying key water issues in urban spaces and providing solutions to these problems.

Vittal has over 15 years of experience in hydrology, geosciences, environmental engineering, remote sensing, environmental impact assessment, policy development and management.

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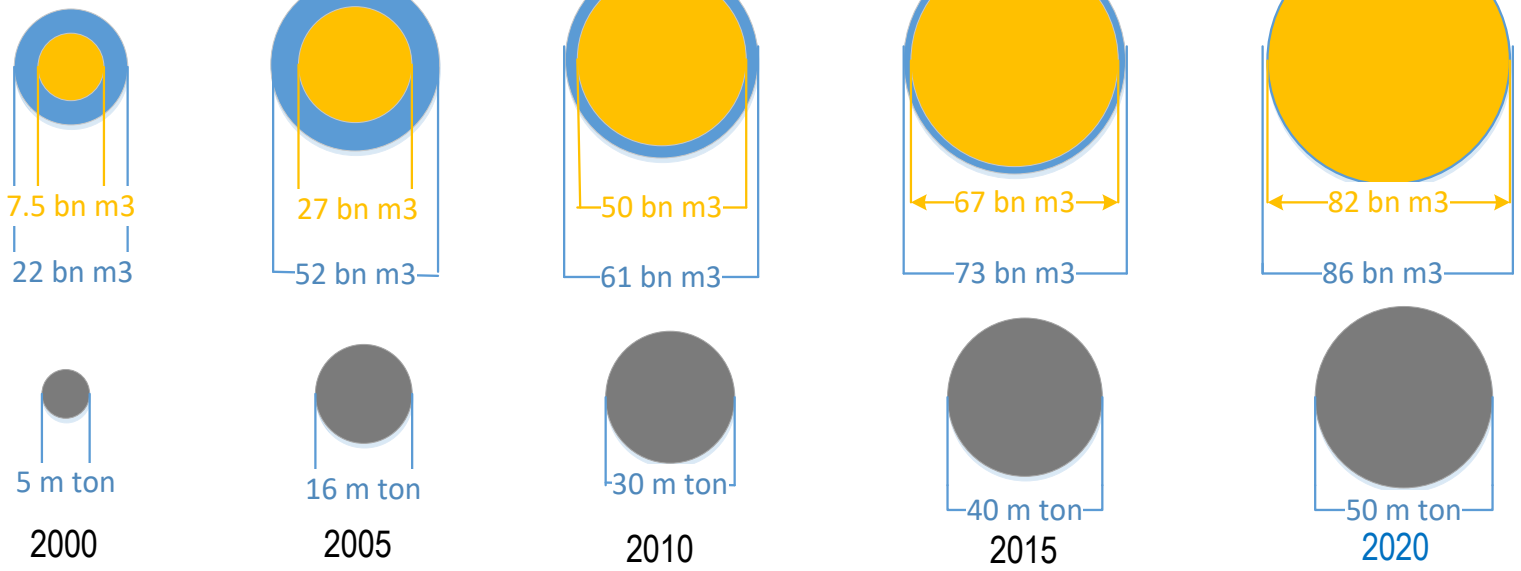
CIRCULAR ECONOMIC CITIES: TRANSFORMING CHINA AND INDIA'S URBAN WASTEWATER

2017 World Water Week @ Stockholm

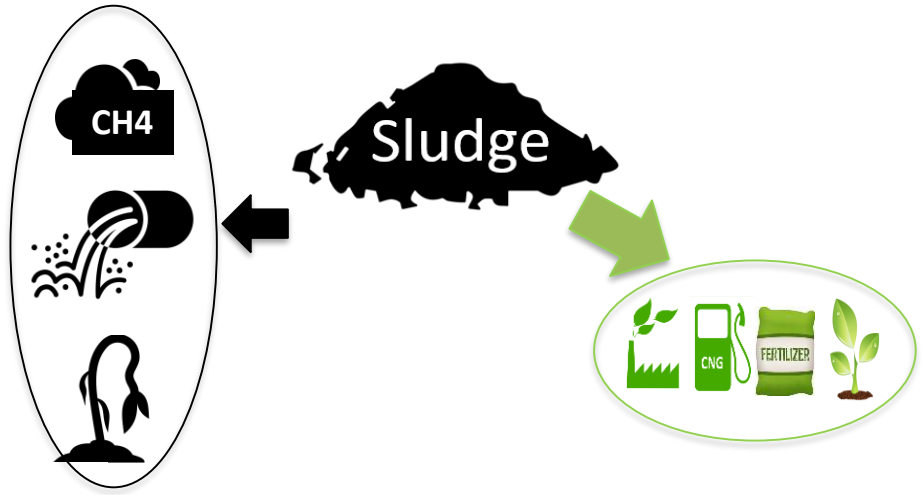
DR. LIJIN ZHONG & XIAOTIAN FU, AUG 30, 2017

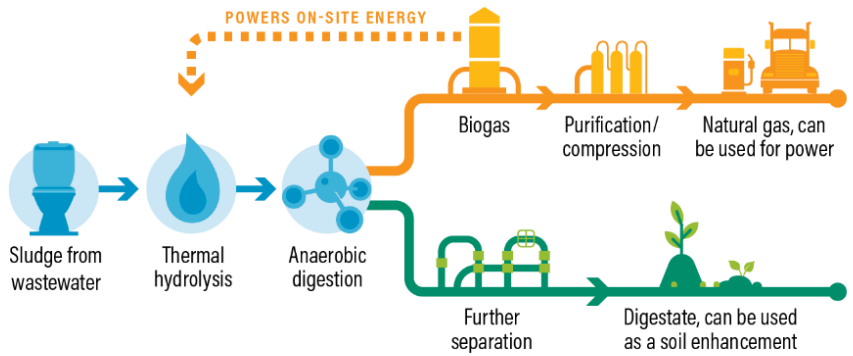
SLUDGE PRODUCTION IN CHINA

- **Boom in production:** 40 million tons sludge produced in Chinese cities in 2015 and estimated 50 million tons in 2020
- **Inappropriate treatment:** over 80% sludge being dumped directly or disposed at landfills



Wastewater production (blue), wastewater treatment (yellow) and sludge production (grey) in China





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BEIJING DRAINAGE GROUP: A CASE TO PRACTICE ENERGY SELF-SUFFICIENT

- Beijing Drainage Group: 12 Reclaimed Water Resources Plants (capacity: **4M+** m^3/per day)
- Sludge production: 6000+ ton per day in total (80% moisture content) to be treated by 5 centralized sludge disposal centers through "thermal hydrolysis + anaerobic digestion + plate-frame dewatering + land application for greening" (3 centers in operation and additional 2 in progress)
- Additional efforts for energy sufficient: Photovoltaic (PV) electric + heat pump
- Resources Recovered by Beijing Drainage Group:
  - ✓ 100% wastewater reused in the city – rehabilitating the water ecosystem in water-scarce Beijing
  - ✓ Biogas production doubled and/or tripled after changing the previous traditional digesters to THP-ed digesters
  - ✓ By 2018, **50%** of the energy demand to be met by StE + PV + others
  - ✓ Biochar for planting trees

POLICIES FOR WASTEWATER AND SLUDGE MANAGEMENT IN CHINA AND INDIA

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LEGEND

- ● : Institutional Arrangement
- ▲ : Price and Financing Mechanism
- ■ : Technology Recommendation
- ● : Development Target

CHINA → ● **INDIA** → ●

1974

THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT

- ● The Act enabled the setting up of a Central Pollution Control Board and subsidiary boards at State level to protect the water quality and control sewage discharge

1977

THE WATER (PREVENTION AND CONTROL OF POLLUTION) CESS ACT

(MLJCA)

- ▲ Polluter pays principle is eabled where every industry and local authority discharging untreated effluents into water bodies shall be penalized and the cess collected will fund water pollution prevention and control measures

1984

WATER POLLUTION PREVENTION AND CONTROL LAW

(NPC)

- ● The competent government agencies at both central and local levels must integrate source water protection and water pollution prevention and control into urban construction plan, construct and improve the drainage network and wastewater treatment facilities

1987

NOTICE ON STRENGTHENING THE URBAN CONSTRUCTION AND DEVELOPMENT

(The State Council)

- ● The government agency for urban construction should take over and integrate the management of urban water supply, drainage and wastewater infrastructure
- ▲ Promote water conservation and wastewater reduction via economic incentives

1991

SUGGESTIONS ON ACCELERATING THE CONSTRUCTION OF CENTRALIZED MUNICIPAL WASTEWATER INFRASTRUCTURES

(MOC/NEPA)

- ● Urban construction agencies and environment protection bureaus should be responsible for the plans, technologies evaluation and review, and investments of centralized wastewater infrastructure constructions
- ● By 1999, 20% wastewater was expected to be treated through centralized wastewater treatment facilities

1999

NOTICE ON STRENGTHENING THE LEVY OF WWTC TO ESTABLISH A BETTER MANAGEMENT FOR MUNICIPAL WW DISCHARGE AND CENTRALIZED TREATMENT

(SDPC/MOC/SEPA)

- ▲ All cities should levy WWTC over the water supply price, and collect the WWTC with water supply prices by urban water supply enterprises
- ▲ WWTC rate should be determined to recover the O&M cost of drainage pipeline and WWTPs and plus a reasonable profits

2000

TECHNICAL POLICIES ON MUNICIPAL WW TREATMENT AND POLLUTION PREVENTION AND CONTROL

(MOC/SEPA/MOST)

- ● By 2010, at least 60% of municipal wastewater was expected to be treated
- ■ The secondary WWTP with daily treatment capacity at 100,000 m^3 and above should adopt AD for sludge disposal

2002

OPINIONS ON PROMOTING THE INDUSTRIALIZATION OF MUNICIPAL WW AND MSW TREATMENT

(SDPC/MOC/SEPA)

- ▲ Encourage the private sector to participate in the investment, construction and operation of municipal wastewater and MSW treatment facilities through BOT and/or other PPP approaches

2007

THE 11th FYP FOR MUNICIPAL WW TREATMENT AND RECLAMATION

(NDRC/MOC/SEPA)

- ● First national subject plan for municipal wastewater, reclaimed wastewater and sludge
- ● By 2010, at least 70% of municipal wastewater was expected to be treated properly
- ■ Landfill was suggested as the preferential disposal method for sludge stabilization

2008

NATIONAL URBAN SANITATION POLICY

(MoUD)

- ● Promotes fully functioning network-based sewerage systems and ensuring connections of households to them wherever possible
- ● Requires proper treatment and disposal of sewage and sludge to protect the public and environment health

2009

TECHNICAL POLICY ON WWTP SLUDGE DISPOSAL AND POLLUTION CONTROL (TRIAL)

(MOHURD/MEP/MOST)

- ● Sludge disposal facilities should be planned, constructed and operated simultaneously with WWTPs
- ■ Encourage energy and resource recovery approaches for sludge disposal
- ▲ WWTC should include the cost of sludge disposal

2011

TECHNICAL GUIDELINES ON MUNICIPAL SLUDGE TREATMENT AND DISPOSAL (TRIAL)

(MOHURD/NDRC)

- ■ It was suggested that the "AD + land application" approach could bring about negative GHG emission according to the GHG emission evaluations between the main approaches for sludge treatment and disposal

	2000	2005	2010	2015	2020
Wastewater Treatment Target in China	25% → 34% (Actual Treatment Rate)	45% → 52% (Actual Treatment Rate)	70% → 82% (Actual Treatment Rate)	85% → 92% (Actual Treatment Rate)	95%
Sludge Disposal Target in China				70%	75%

2012

NATIONAL WATER POLICY

(MoWR)

- ● Require urban water supply and sewage treatment schemes be integrated and executed simultaneously
- ▲ Mandate that water supply bills also include sewerage charges

THE 12th FYP FOR NATIONAL MUNICIPAL WW TREATMENT AND RECLAMATION

(The General Office of the State Council)

- ● By 2015, at least 85% of municipal wastewater was expected to be treated properly and at least 70% sludge produced from municipal WWTPs was expected to be treated and stabilized properly
- ■ Encourage to adopt AD /or aerobic fermentation to dispose sludge and use the treated sludge for land application

2015

ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION

(MoUD)

- ● Ensure that every urban household has access to a tap with assured supply of water and a sewerage connection

SMART CITIES: MISSION STATEMENT & GUIDELINES

(MoUD)

- ● Each city must include waste water recycling in the Smart City Proposal

NOTICE ON SETTING UP AND ADJUSTING THE RATES OF WWTC

(NDRC/MOF/MOHURD)

- ▲ Increase the rate of WWTC to cover the O&M cost of wastewater treatment and sludge disposal and a reasonable profitl

2017

NATIONAL POLICY ON FAECAL SLUDGE AND SEPTAGE MANAGEMENT

(MoUD)

- ■ Maximum reuse of treated sludge as fertilizer in farmlands, parks, gardens and other such avenues, reuse of treated sewage, as source of energy where feasible, and any other productive uses

Notice on Applying PPP Approaches in WW and Waste Treatment Projects Which Governments Are Involved in

(MOF/MOHURD/MOA/MEP)

- ▲ It was suggested to apply PPP models for the new constructed wastewater and solid waste projects which government is involved in

2016

DRAFT WATER FRAMEWORK BILL

(MoWR)

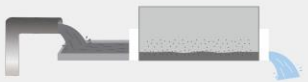
The appropriate Government shall:

- ● Make all efforts for appropriate treatment of wastewater and its gainful utilisation
- ● Evolve and implement economic models that promote sustainability of recycle-reduce-and-reuse of water resources

THE 13th FYP FOR NATIONAL MUNICIPAL WW TREATMENT AND RECLAMATION

(NDRC/MOF/MOHURD)

- ● By 2020, at least 95% of municipal wastewater will be treated properly and at least 75% of sludge produced from WWTPs will be disposed
- ■ Encourage to recover energy and resources as much as possible from sludge, and use biochar for landscape and city greening



POLICIES FOR CLIMATE CHANGE AND ORGANIC WASTE-TO-ENERGY IN CHINA AND INDIA

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LEGEND

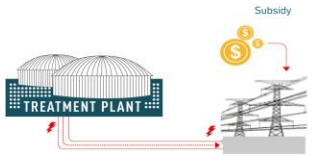
- ● : Institutional Arrangement
- ▲ : Price and Financing Mechanism
- ■ : Technology Recommendation
- ● : Development Target

CHINA

2007 NATIONAL PLAN FOR CLIMATE CHANGE

(The State Council)

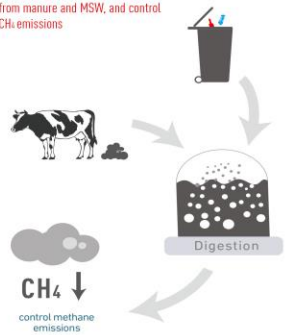
- ● The administrative agency for climate change was set up in the NDRC
- ● Strengthen the management of manure, wastewater and MSW, capture and use biogas produced from waste, and control CH_4 emission
- ▲ Provide subsidy to power generation from landfill gas or waste incineration
- ▲ Apply preferential tax for landfill gas capture and use project



2011 WORK PLAN FOR GHG EMISSION CONTROL IN THE 12th FYP

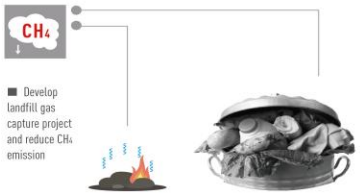
(The State Council)

- ● Control non-CO_2 emission (including CH_4)
- ■ Strengthen resource recovery from manure and MSW, and control CH_4 emissions



2012 THE 12th FYP FOR MSW TREATMENT AND DISPOSAL

(The State Council)



- ■ Develop landfill gas capture project and reduce CH_4 emission
- ■ Encourage kitchen waste-to-biogas project and the co-treatment of kitchen waste with other biodegradable waste

TENTATIVE MANAGEMENT MEASUREMENT ON VOLUNTARY GHG EMISSION TRADING

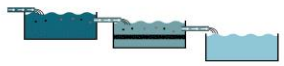
(NDRC)

- ▲ Encourage project-level voluntary GHG emission trading
- ▲ CO_2 and 5 types of non-CO_2 gases (including CH_4) emission can be traded under voluntary GHG emission trading

2014 NATIONAL ACTION PLAN ON CLIMATE CHANGE (2014-2020)

(NDRC)

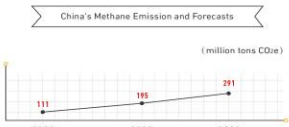
- ● Build up low-carbon and energy efficient water and sanitation infrastructures in cities
- ● Control waste discharge and promote treatment and resource recovery from kitchen waste
- ● Promote R&D in resources recovery technologies from wastewater, sludge and MSW



2015 CHINA'S INTENDED NDCS: ENHANCED ACTIONS ON CLIMATE CHANGE

(NDRC)

- ▲ Improve GHG accounting in waste sector
- ■ Strengthen the capture and use of landfill gas



(Source: Opportunities To Enhance Non-Carbon Dioxide Greenhouse Gas Mitigation In China. World Resources Institute. 2016)

2°

INDIA

2008 NATIONAL ACTION PLAN ON CLIMATE CHANGE

(Government of India)

- ● Commenced 8 national missions to promote climate change adaptation and mitigation, energy efficiency and natural resource conservation
- ■ Emphasis on recycling of material and urban waste management to produce power from waste to eliminate GHG emission

NATIONAL MISSION ON SUSTAINABLE HABITATS

(MoUD)

- ■ GHG mitigation measures at urban scale include full collection, conveyance and treatment of wastewater, reuse of treated effluent and gas recovery from sludge

2015 INDIA'S INTENDED NDC: WORKING TOWARDS CLIMATE JUSTICE

(Government of India)

- ● Non-CO_2 emissions counted in NDC
- ■ Promote waste-to-wealth paradigm (including WtE) to achieve environmental and climate benefits
- ● Focus on reducing emissions from waste sector
- ● Requires set up of new mission to support WtE

POLICIES FOR RENEWABLE ENERGY AND ORGAIC WASTE-TO-ENERGY IN CHINA AND INDIA

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CHINA

2005
RE LAW
(NPC)

- Energy authorities at county-level and above are responsible for managing the RE development and use
- Gas grid corporates should allow the biogas and heat produced by biomass, which meets certain requirements, to be connected to the grid

2008
THE 11th FYP FOR RE DEVELOPMENT
(NDRC)

- First RE plan of China
- ▲ Promote industrialization and commercialization of bioenergy
- By 2010, the installed capacity of biomass power generation was expected to meet 5.5 million kW, among which 1 million kW from biogas; biogas utilization was expected to reach 19 billion m³
- Promote biogas recovery from wastewater

2011
WORK PLAN FOR ENERGY CONSERVATION AND POLLUTANT REDUCTION DURING THE 12th FYP
(The State Council)

- Promote the development of bioenergy
- ■ Encourage power and heat generation from MSW incineration and landfill gas, and resource recovery from kitchen waste

2012
TENTATIVE MANAGEMENT MEASUREMENT ON SUBSIDY FOR RE POWER TARIFF
(MOF)

- ▲ Subsidy for RE power generation project is determined according to the feed-in tariff of RE power generation and the benchmarked electricity price of coal-fired units with desulphurization
- ▲ NDRC would determine a motivated electricity price for RE according to the energy sources and technologies applied and local social and economic conditions

THE 12th FYP FOR BIOENERGY DEVELOPMENT
(NEA)

- First bioenergy plan of China
- By 2015, the installed capacity of biomass power generation was expected to meet 13 million kW, among which 2 million kW from biogas; biogas utilization will reach 22 billion m³
- ■ Select appropriate methods to recover energy from MSW and sludge, and promote biogas power generation from WWTPs

2016
THE 13th FYP FOR BIOENERGY DEVELOPMENT
(NEA)

- Promote to install CHP system in both industrial organic wastewater and municipal wastewater treatment
- By 2020, the total installed capacity of biomass power generation will reach 13 million kW, among which 0.5 million kW from biogas; biogas utilization will reach 8 billion m³
- Incorporate biomass energy utilization into national plans for energy, environment and agriculture, and conduct researches on including biomass energy into green consumption and trading system
- Build up obstacle-free connection system for bio-CNG and power generated from biomass to the gas and electricity grid

NATIONAL STRATEGY ON ENERGY PRODUCTION AND CONSUMPTION (2016-2030)
(NDRC/NEA)

- Promote the development of bioenergy
- ■ Accelerate the development of biomass heating, bio-CNG, and rural biogas utilization

LEGEND
- : Institutional Arrangement
- : Technology Recommendation
- : Price and Financing Mechanism
- : Development Target

2017
NOTICE ON SUBMITTING THE ANNUAL CONSTRUCTION PLAN FOR RE PROJECTS DURING THE 13th FYP
(NEA)

- ■ The new installed capacity of biogas power generation is not limited by the provincial plan on the new power generation capacity, and can exceed the original planned capacity

INDIA

2011
STRATEGIC PLAN FOR NEW AND RENEWABLE ENERGY SECTOR FOR THE PERIOD 2011-2017
(MNRE)

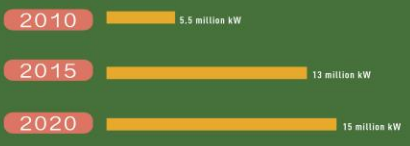
- Total target for U&I WtE to achieve 324 MWeq by 2017 and 800 MWeq by 2022
- Urban WtE plants to generate 64 MWeq by 2017

2013
PROGRAMME ON ENERGY FROM URBAN, INDUSTRIAL AND AGRICULTURAL WASTES/RESIDUES DURING 12th PLAN PERIOD
(MNRE)

- Provide CFA in the form of capital subsidy and GiA for power generation from biogas at Sewage Treatment Plant or biomethanation of urban and agricultural waste/residues including cattle dung or production of bio-CNG

Provide CFA for power generation from biogas at Sewage Treatment Plant, biomethanation or production of bio-CNG

NATIONAL TARGETS OF BIOMASS POWER GENERATION



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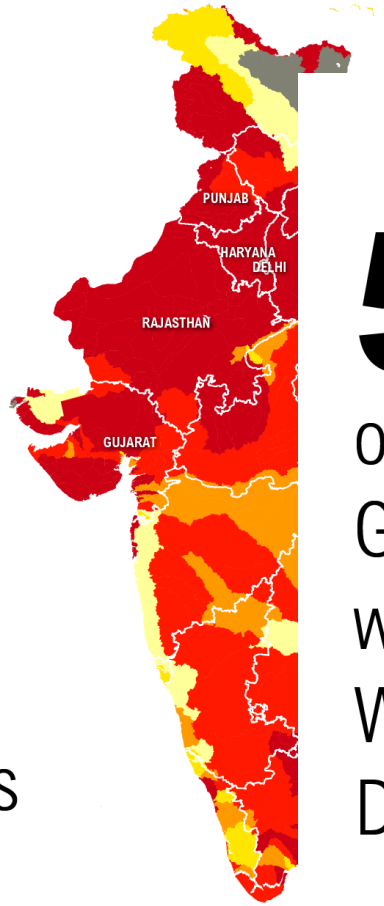
2017 World Water Week @ Stockholm

CIRCULAR ECONOMY CITIES: TRANSFORMING INDIA'S URBAN WASTEWATER

SAHANA GOSWAMI AND VITTAL BOGGARAM, AUG 30, 2017

A product of WRI Ross Center for Sustainable Cities

54%
of India
Faces
High to
Extremely
High
Water Stress



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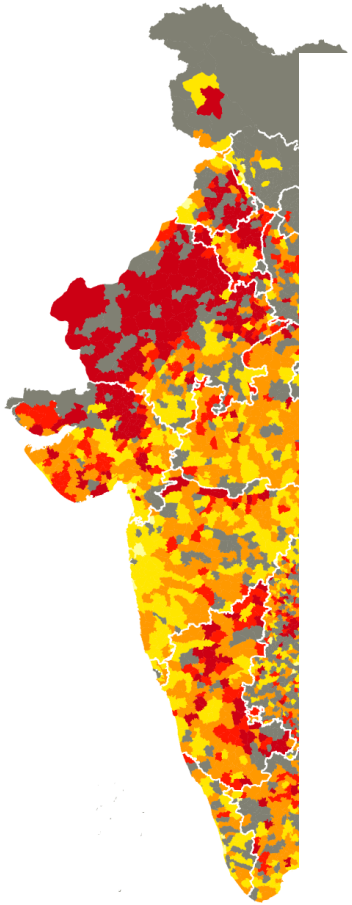
54%
of India's
Ground-
water
Wells Are
Decreasing



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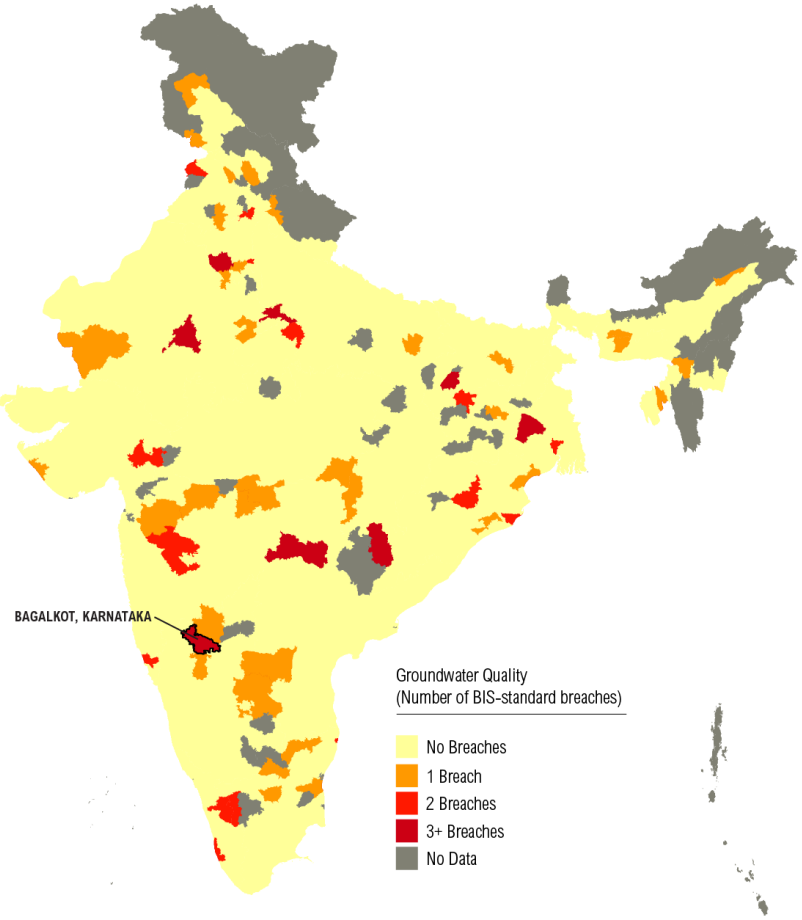
More than
100
MILLION
People Live
in Areas of
Poor Water
Quality



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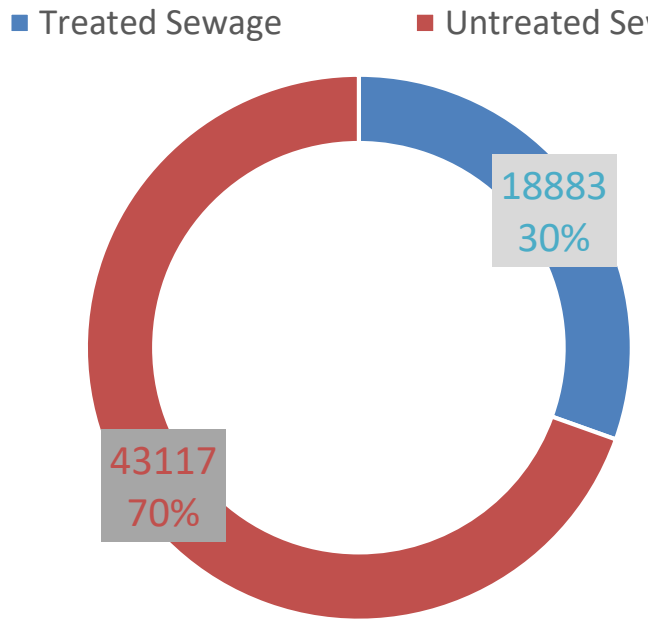
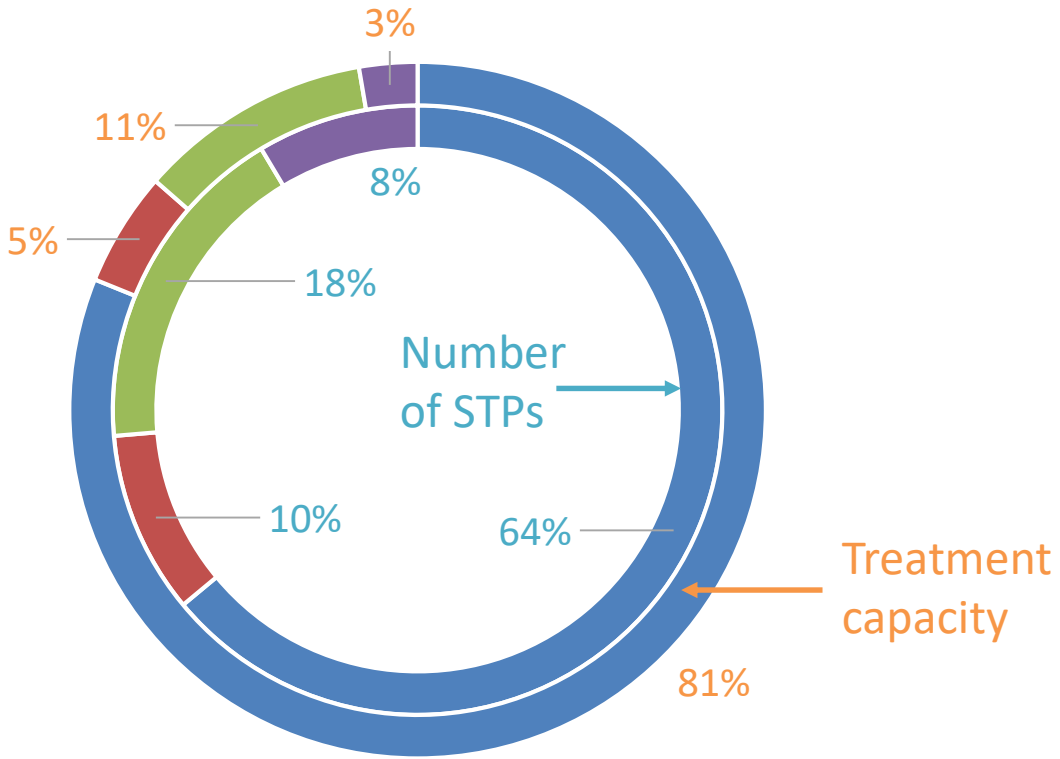
INDIA'S WASTED WATERS

Total sewage generated 62000 MLD



Out of 816 STPs only **522** are functional



70% of wastewater (sewage) is released untreated into water bodies

Source: Central Pollution Control Board. Inventorization of Sewage Treatment Plants. March 2015

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MANAGING WASTE WATER 2005 TO 2015

	2005	2015	% increase
Treatment Capacity	19827.38	23277.36	15%
Generated	53898.82	62000	13%
% treatment capacity	37%	38%	
All units are in million liters per day (MLD)			

Installed treatment capacity of STPs in relation to wastewater generated

Figure 1: Sewage generation (yellow) vs. treatment capacity (green) in Indian cities[2]

Sources: Central Pollution Control Board, Status of water supply, wastewater generation and treatment in Class I cities and Class II towns, 2010. | Central Pollution Control Board. Inventorization of Sewage Treatment Plants. March 2015 | http://www.igep.in/live/hrdpmp/hrdpmaster/igep/content/e48745/e57806/e61054/e61056/LegalandPolicyFrameworkforWastewaterBackgroundReview.pdf

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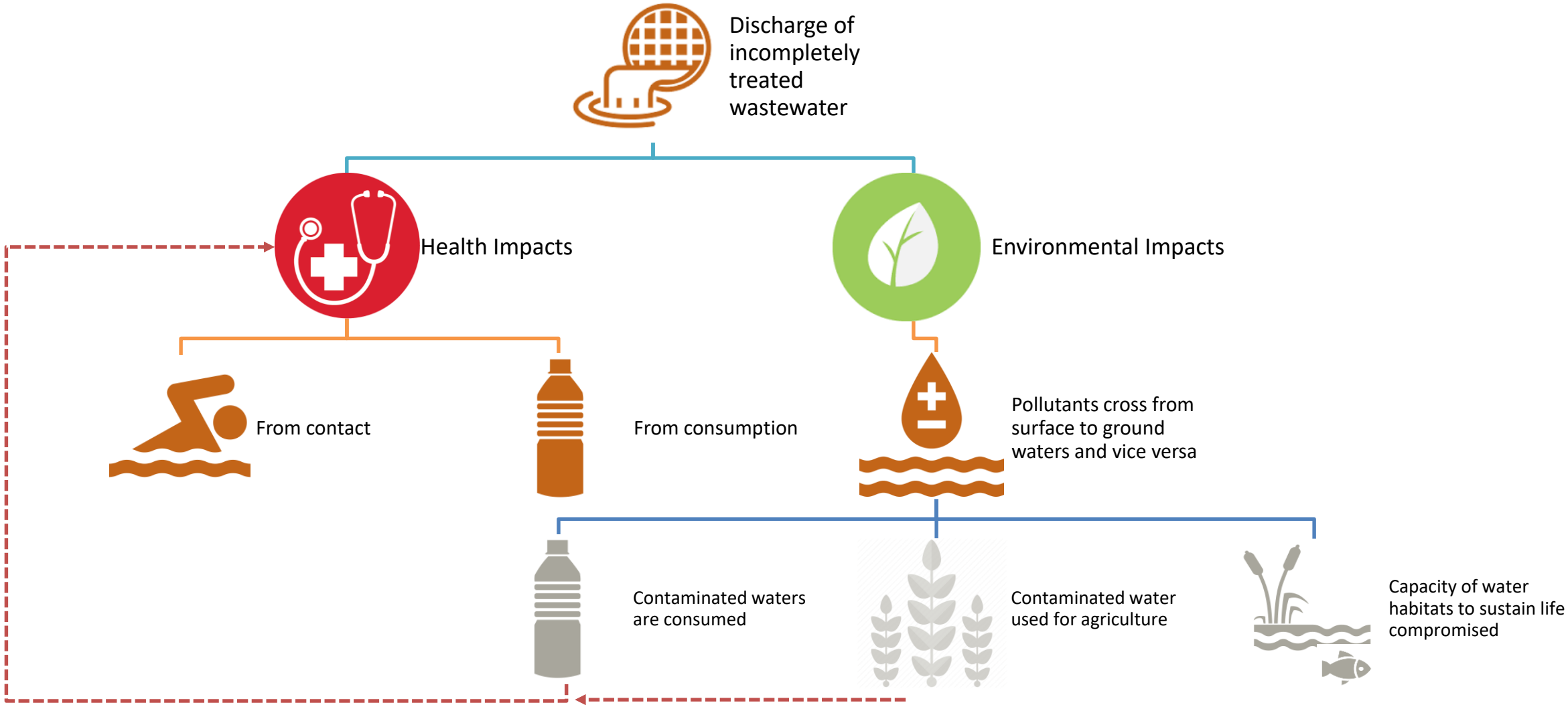
WASTE WATER IMPACTS



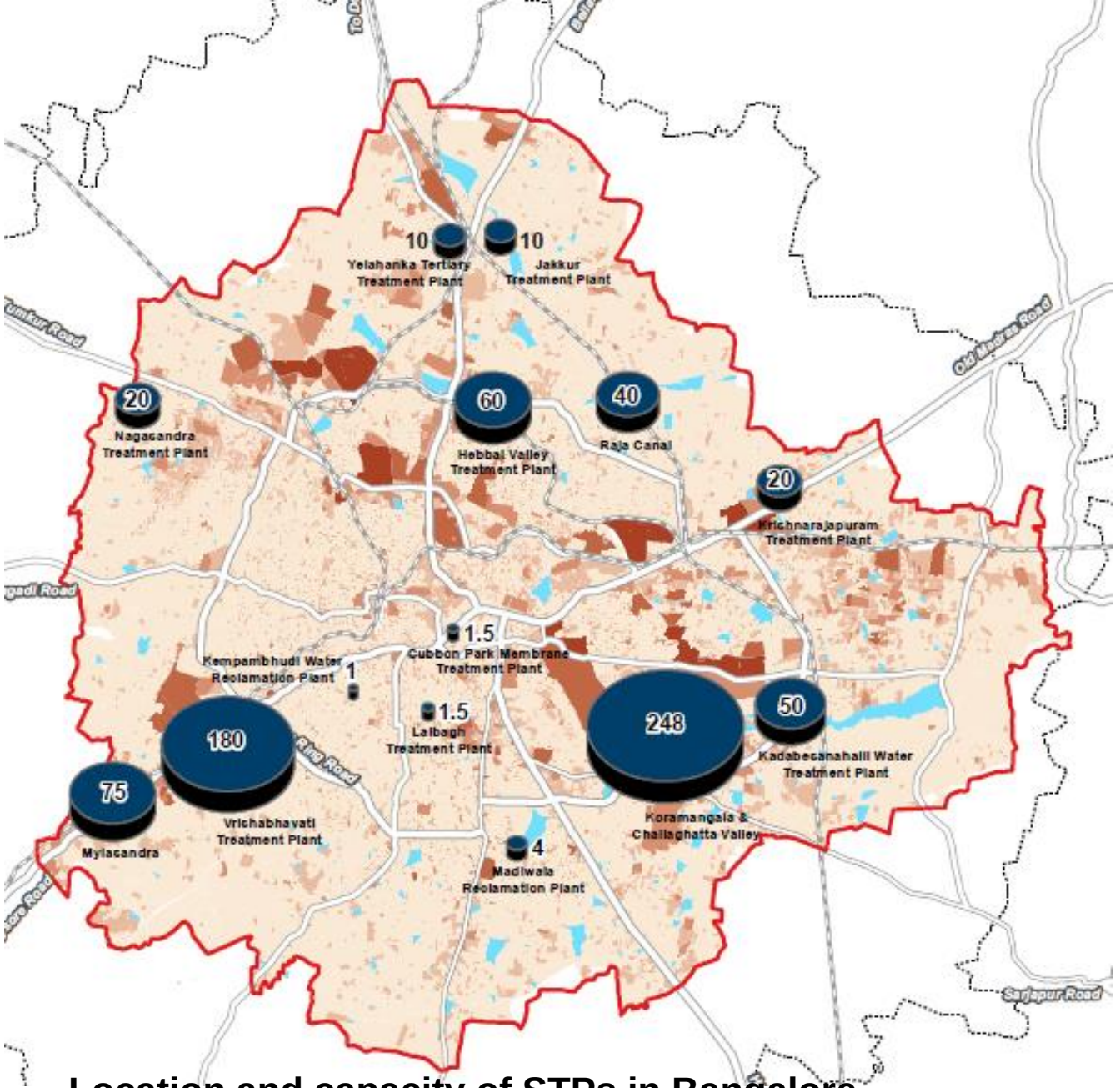
BENGALURU CASE STUDY

Sewage Generated
743 MLD*

Treatment Capacity
721 MLD

Average Treated Sewage
520 MLD

Untreated Sewage
223 MLD



Location and capacity of STPs in Bangalore

* Estimates from WRIs city water balance analysis

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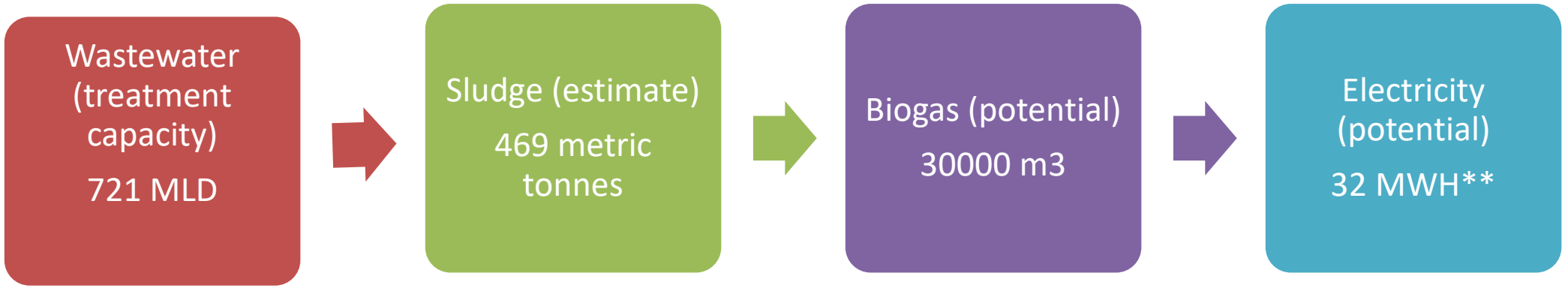
SCOPE IN BENGALURU

Daily Production*



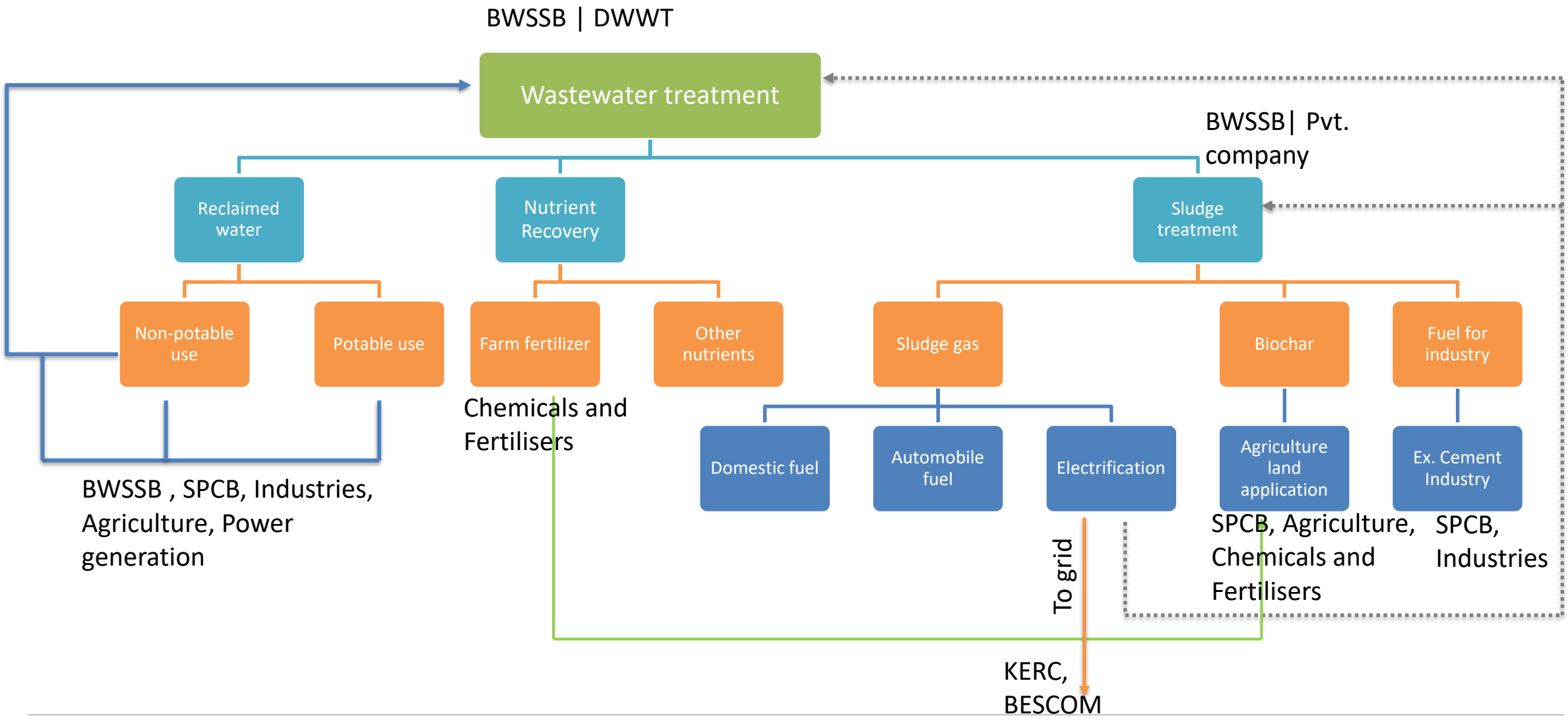
**Would meet ~1/4 of current energy needs of Bangalore's 14 STPs

32 MWH electricity potential is comparable to a 1.5MW thermal plant***

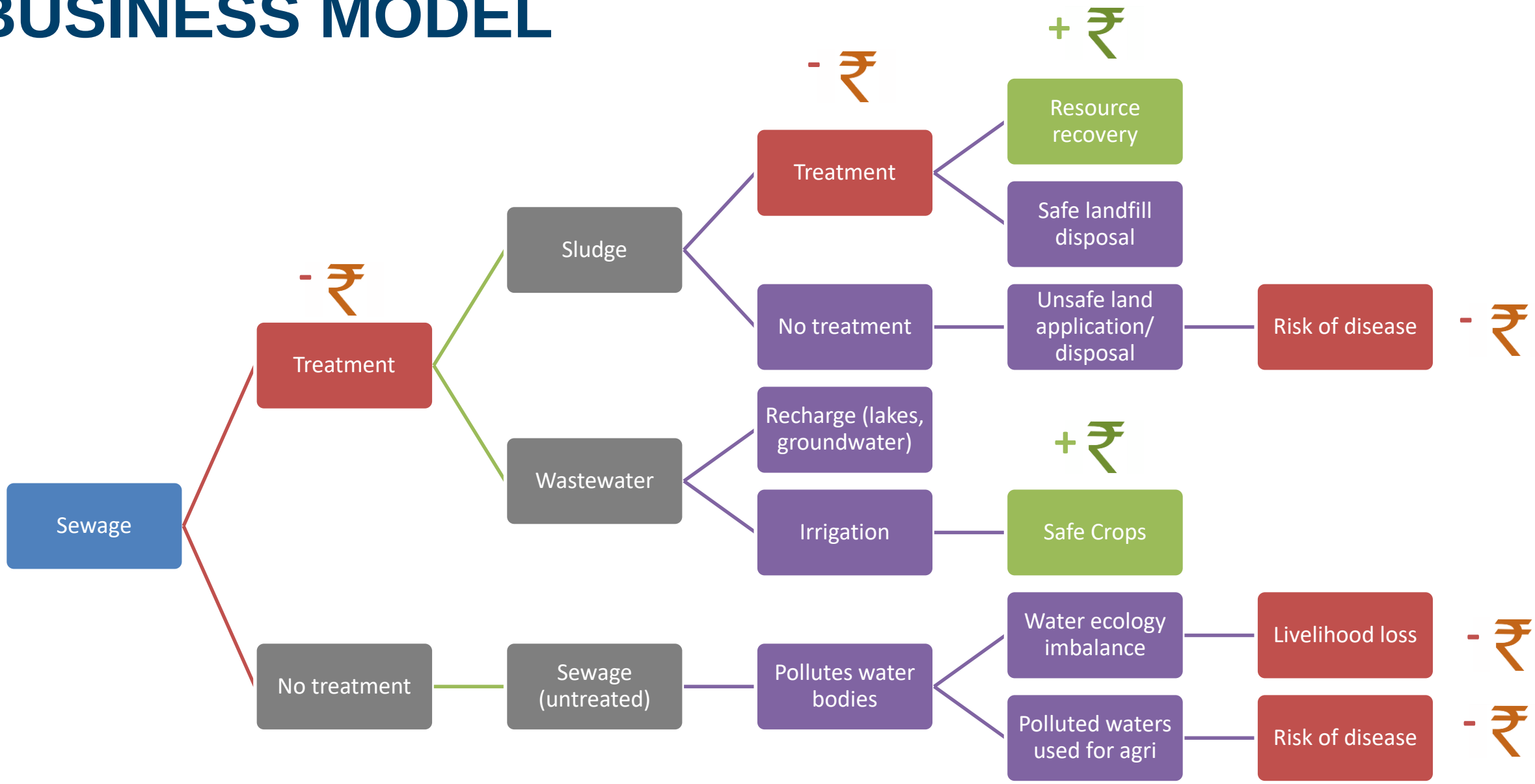
*Estimates made using WRIs Carbon Calculator For Sludge-To-Energy

***(1.5MW capacity plant – in theory working 24 hours/ day would generate 36 MWH units of electricity)

CIRCULAR ECONOMY FOR WASTE WATER

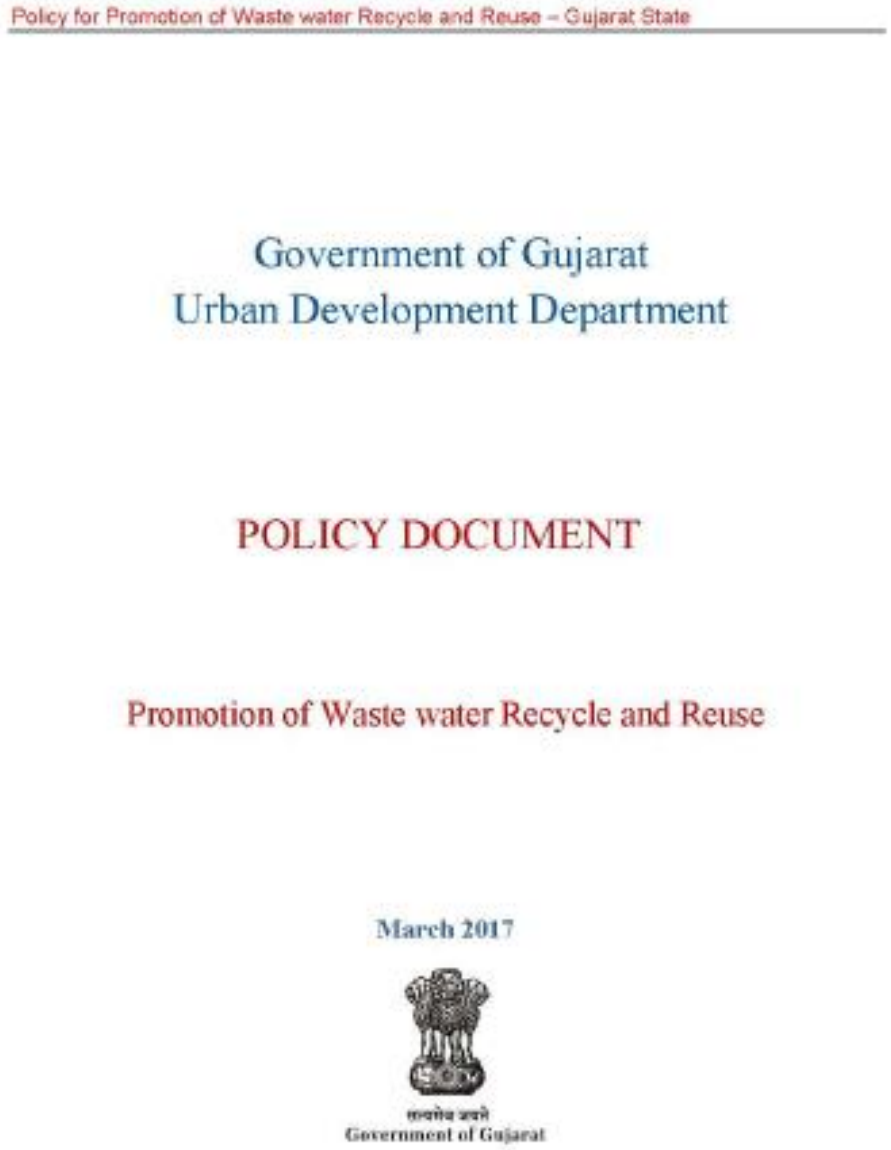


BUSINESS MODEL

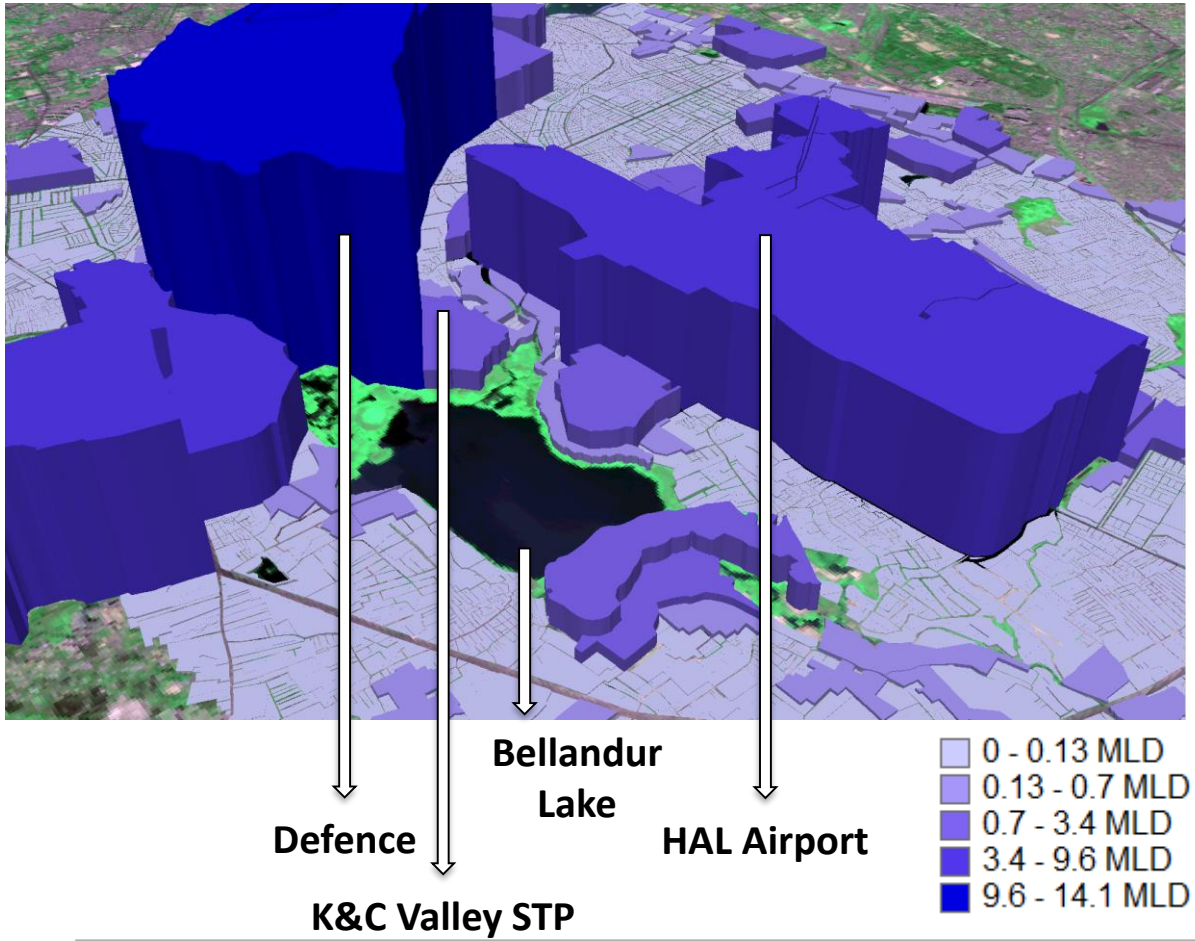


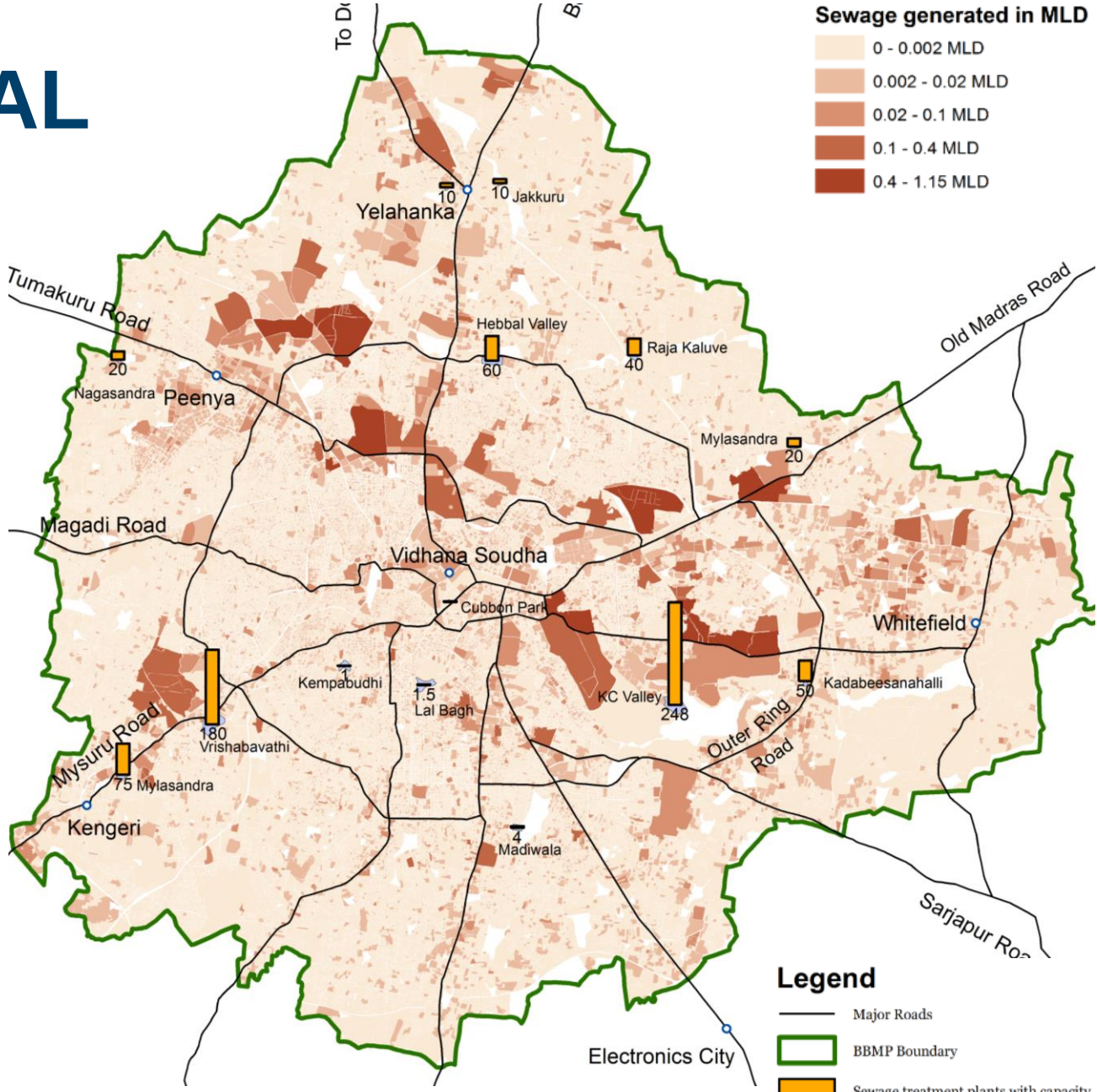
WRI ENGAGEMENT

- GoG draft Waste Water Recycle-Reuse Policy
- MoU with MOUD - AMRUT Capacity Building
- City Water Assessment Tool (CWAT) for Bengaluru



WATER REUSE POTENTIAL





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CIRCULAR ECONOMY CITIES: TRANSFORMING CHINA AND INDIA'S URBAN WASTEWATER

Time: 14:00-15:30, August 30, 2017
Venue : Nl Music Hall