FIFTH MEETING
GMS Urban Development Working Group
23 FEBRUARY 2022

Attachment 3: Session 3 Presentations

1

FIFTH MEETING
GMS Urban Development Working Group
23 FEBRUARY 2022

Dr. Greg RYAN
Director, Business Excellence
Water Services Association of Australia

Session 1: Smart solutions for building urban water system resilience

2

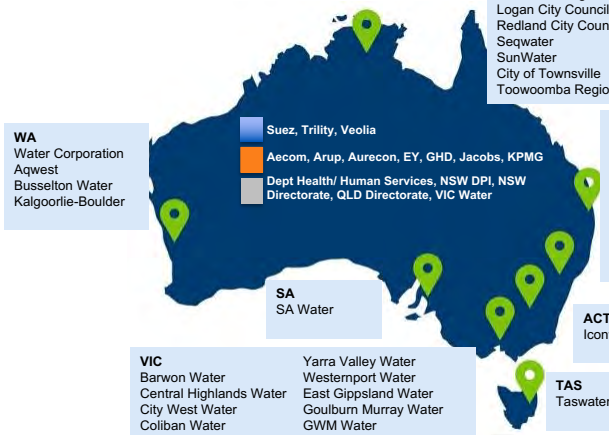
WATER SERVICES ASSOCIATION OF AUSTRALIA

Digital Transformation of the Australian Urban Water Sector

Greg Ryan
Director Business Excellence

3

Who is Water Services Association of Australia?



NT
Power and Water Corporation

WA
Water Corporation
Aqwest
Busselton Water
Kalgoorlie-Boulder

SA
SA Water

VIC
Barwon Water
Central Highlands Water
City West Water
Coliban Water
Gippsland Water
Goulburn Valley Water
Melbourne Water
South East Water
Western Water
Yarra Valley Water
Westernport Water
East Gippsland Water
Goulburn Murray Water
GWM Water
North East Water
Wannon Water
Lower Murray Water
South Gippsland Water
Southern Rural Water

ACT
Iconwater

TAS
Taswater

QLD
Queensland Urban Utilities
City of Gold Coast
Gladstone Area Board
Gladstone Regional Council
Logan City Council
Redland City Council
Seqwater
SunWater
City of Townsville
Toowoomba Regional Council
Unitywater
Banana Regional Council
Isaac Regional Council
Ipswich Council
Mackay Regional Council
Mount Isa Water Board
Southern Downs Regional Council
Wide Bay Water
Cairns Water
Western Downs Regional Council
Whitsunday Regional Council

NSW
Central Coast Council
Goldenfields Water
Hunter Water
Shoalhaven Water
Sydney Water
WaterNSW
Queanbeyan Regional Council
Centroc (11 Councils)
ORANA (11 Councils)
Riverina Water
Rous County Council
Byron Shire Council
Eurobodalla Shire Council
Lismore City Council
MidCoast Water
Port Maquarie-Hastings Council
Tweed Shire Council
Dubbo City Council
Kempsey Shire Council

NZ
Watercare Services
Wellington Water

Private Utility
Consultant
Stakeholder

4

WSAA's central functions

1. Collaboration
- Between members information sharing and problem solving
- On projects that are too big or expensive to do alone

2. Advocacy
- Representing industry interests in at a national level
- Influencing policy
- International representation

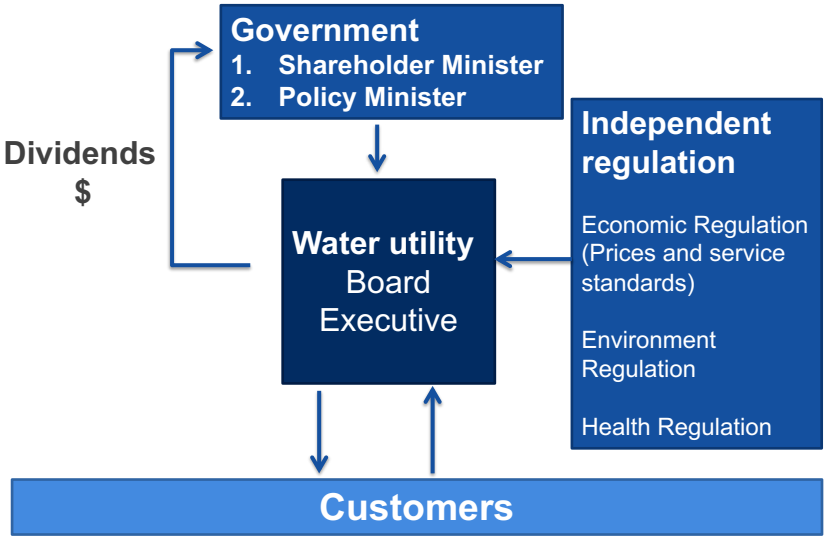
3. Innovation
- A filtering point for latest technology
- Introducing new ideas from Australia and overseas
- Benchmarking

5

Digitalisation of the water sector

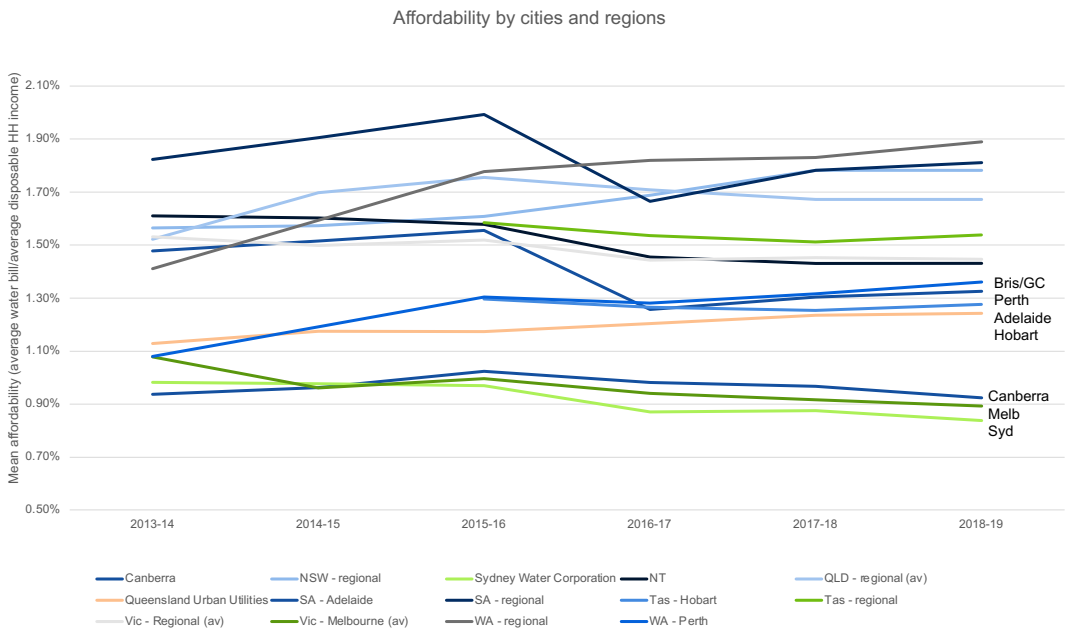
6

Institutional arrangements in Australia



7

Affordability across Australia



8

Australian Water industry digital transformation journey

Engage the customer

Sweat the assets

Pre 2010
Discrete business systems
- Customer
- Operations
- GIS

2010 to 2015
Supplier led digital solutions
- Smart meters
- Customer relationship management

Customer at the heart / Customer centric

2016-2018
Industry awareness of digital maturity and digital groups started to form within leading water businesses

Informed procurement

COVID19

2019-21
Integration of enterprise systems – data lakes

Frameworks for digital strategy development

Digital architecture

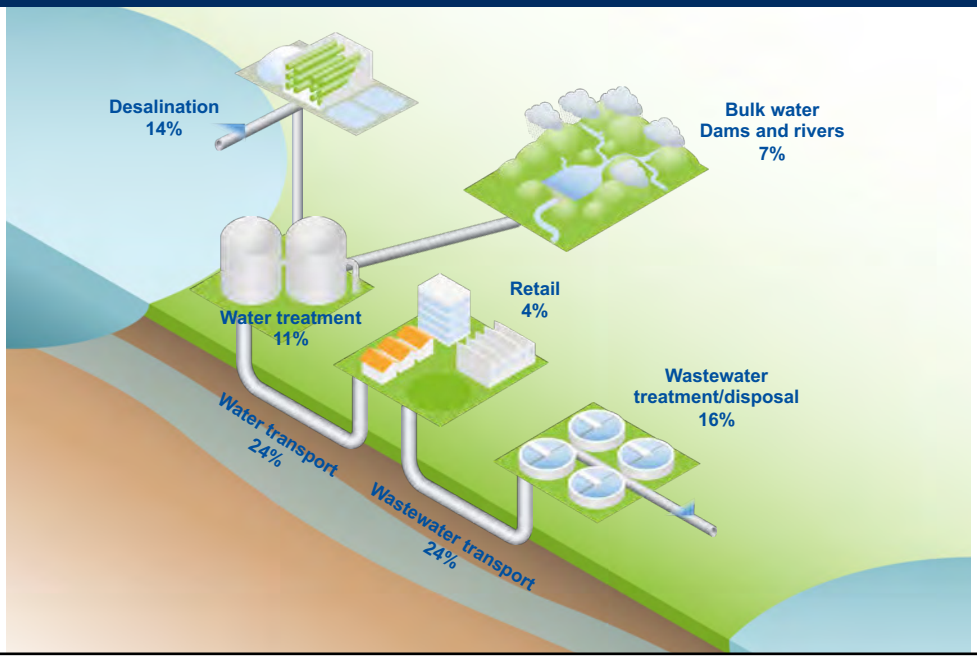
Customer driven

2022-25
Business intelligence
- Strat planning
- Modelling
- AI/ML

Integrated digital business transformation
- Automation
- Self service
- Interoperability

9

Typical urban water bill makeup – potential returns



10

Digital utility case study – SE Water

11

SE Water Digital Journey

- **Started shortly after formation in 1995**
  - Development of in house digital options for vehicle tracking and customer relationship management
- **Early 2000's started partnering relationships with contractors, led to**
  - External business – IOTA, delivering solutions for water businesses in Victoria, Australia and Internationally
  - Keen focus on digital technology implementation including:
    - Optimisation of pumping systems
    - IoT devices beyond the meter
    - 3D printing
- **Around 2008 moved to a fairly centralised model for IT deployment, looking at BI technology and enterprise reporting.**
- **Around 2015 started investigation of options for smart meter deployment at scale**
  - Developed standards and specifications
  - Understood key contracting options
  - Started pilot deployments in 2017-18
  - Rapidly changing environment for technology and service provision options has been challenging – pushing for technology agnostic solutions, data ownership and streamlined management.

12

SE Water Case Study: Aquarevo

13

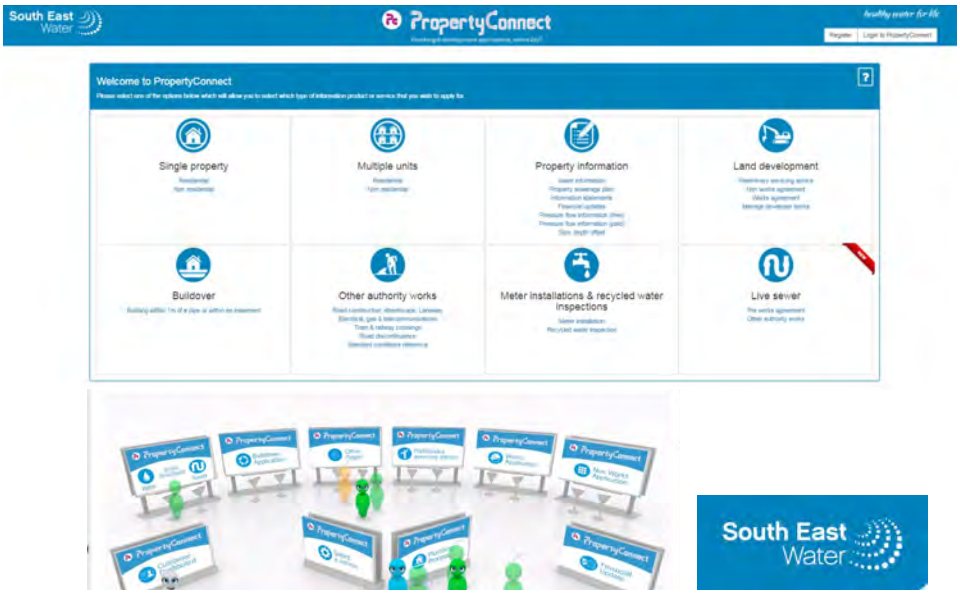
Aquarevo – benefits/outcomes

Water sensitive outcomes

- Up to 70% reduction in potable supply
- Up to 75% reduction in wastewater discharged offsite
- Up to 55% reduction in mean annual stormwater discharge to waterways
- Up to 20% reduction to peak runoff events
- Up to 35% reduction in stormwater nutrient loads beyond best practice
- An additional 55 ML/year of water infiltrated to enhance soil moisture and support urban forest

14

Property Connect (South East Water)



15

Digital Utility Case Study – SA Water

16

SA Water Journey

- **Digitalisation journey started with internal system optimisation, followed by enterprise system development**
- **Around 2015 there was significant political pressure to reduce leakage**
- **This resulted in several measures to reduce leakage and water breaks**
- **The utility developed the lowest leakage rates in the country, yet still pressure to improve – based on public perception**
- **Resulted in a significant shift in digitalisation in several ways:**
  - Reducing costs – playing on the spot electricity market and setting the timing of pumps to minimise electricity costs and also generate back to the grid
  - Development of a sensor grid for the city (and now regional areas)
  - Automation of monitoring and dispatch of field crews for optimisation and safety

17

SA Water – Smart Water Network

Early detection and prevention of leaks and breaks – before the customer notices them

Ability to monitor and respond to system changes in real time

18

Safety (SA Water)

In-Vehicle Safety Solution that will give:

- Roll over alerts
- Automated geo-fence alerts
- Engine system data – driver behaviour & fleet management
- Help buttons

SAFE VERYBODY VERY JOB VERY DAY

Increasing staff safety through:

- 24/7 Operational Control Centre support
- Satellite connectivity where required
- Wearable personal safety technology

SA Water

19

Key Messages

20

Key messages for digital implementation

1. **Make a start, but initially start small and fail fast**
2. **As the acceptance of digital integration increases develop a whole of business digital strategic approach aligned with business needs and direction**
3. **Don't get distracted by new technology, focus on the technology that addresses key business needs and problems**
4. **Good data is paramount**

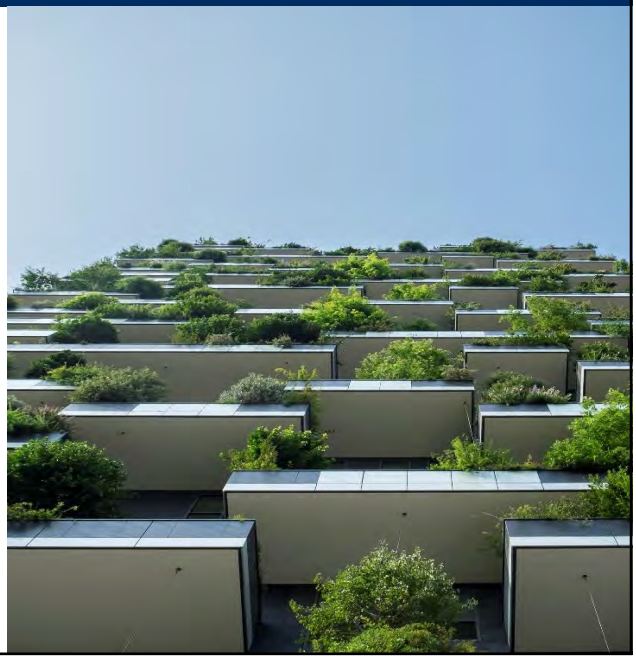
21

How to find us

Twitter
@greg_ryan
@wsaa_water

LinkedIn
Water Services Association of Australia

Web
www.wsaa.asn.au



22

FIFTH MEETING

GMS Urban Development Working Group

23 FEBRUARY 2022

Country Presentation: Cambodia

23

Contents

I. Country Information

II. Urban Issues

III. Project Profile

IV. Possible Solutions

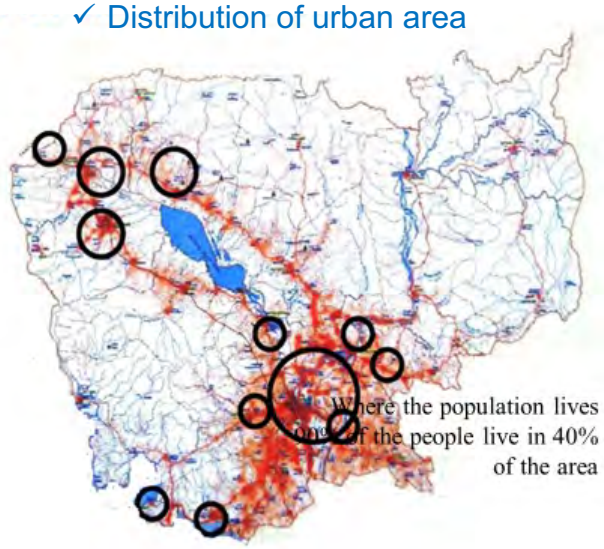
24

Country Information

✓ Background

- ✓ Population: 16.07 millions
- ✓ Land Area: 181, 035 km²
- ✓ Density: 88.76 person/km²
- ✓ Capital City: Phnom Penh (Population: 2.5 millions)

✓ Distribution of urban area



25

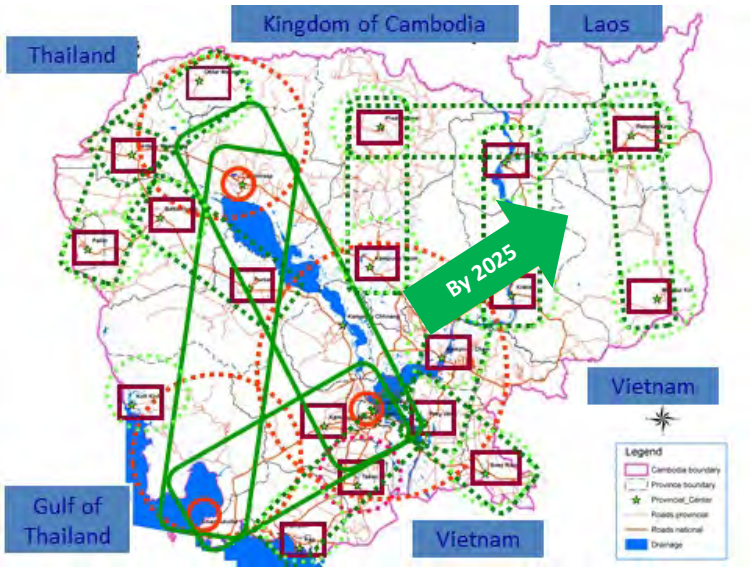
✓ Strategy and Goal

- **Rectangular Strategy-Good Governance:** *Promotion of Economic Growth; Generation of Employment; Implementation of Governance Action Plan (AP); and Enhancing Efficiency and Effectiveness in implementing the reform programs.*
- **The Government of Cambodia (GOC) has adopted the Millennium Development Goal (MDG) targets** for water supply and sanitation, specifying that, by 2030, 90% of the urban population and 80% of the rural population should have access to safe water, and that 85% of the urban population and 80% of the rural population should have access to improved sanitation.

26

Urban Issues

✓ Urban Development Concept

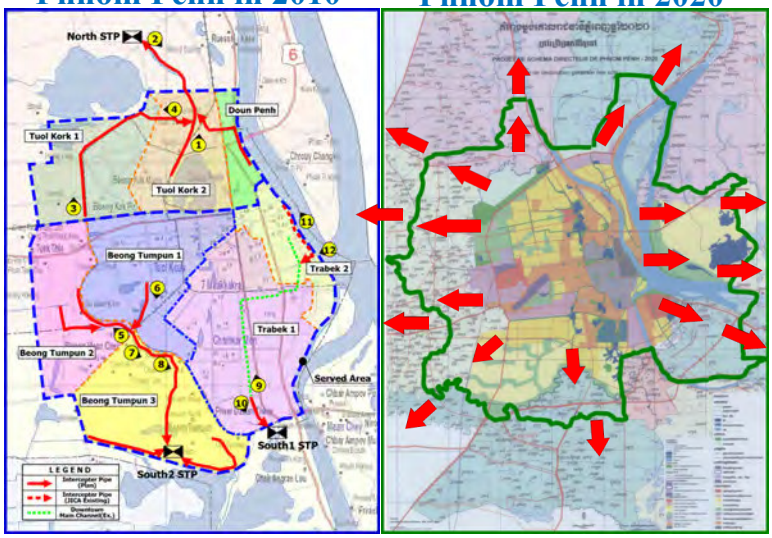


27

Urban Issues

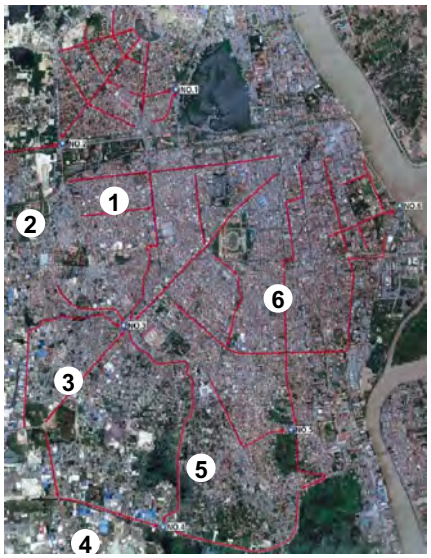
✓ Phnom Penh Expansion

Phnom Penh in 2010 Phnom Penh in 2020



28

✓ Phnom Penh Surface Water Quality



Sampling Location

Water quality

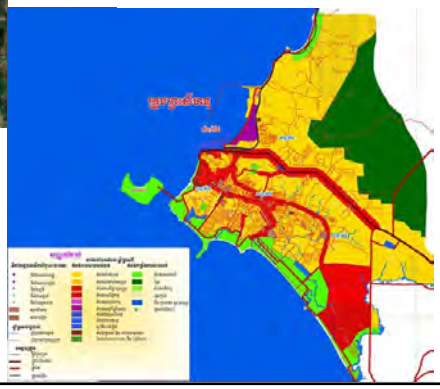
	BOD	SS	COD	T-N	T-P
1	103.2	183.0	56.1	38.8	4.0
2	24.6	32.5	23.4	15.5	1.6
3	27.3	68.0	24.0	20.6	2.3
4	26.7	67.0	25.3	19.3	2.1
5	147.6	142.0	54.1	30.9	3.3
6	110.4	56.0	52.2	40.8	4.1

29

✓ Siem Reap River Flow & Water Level Regulation

30

✓ Sihanoukville Sewage System Division

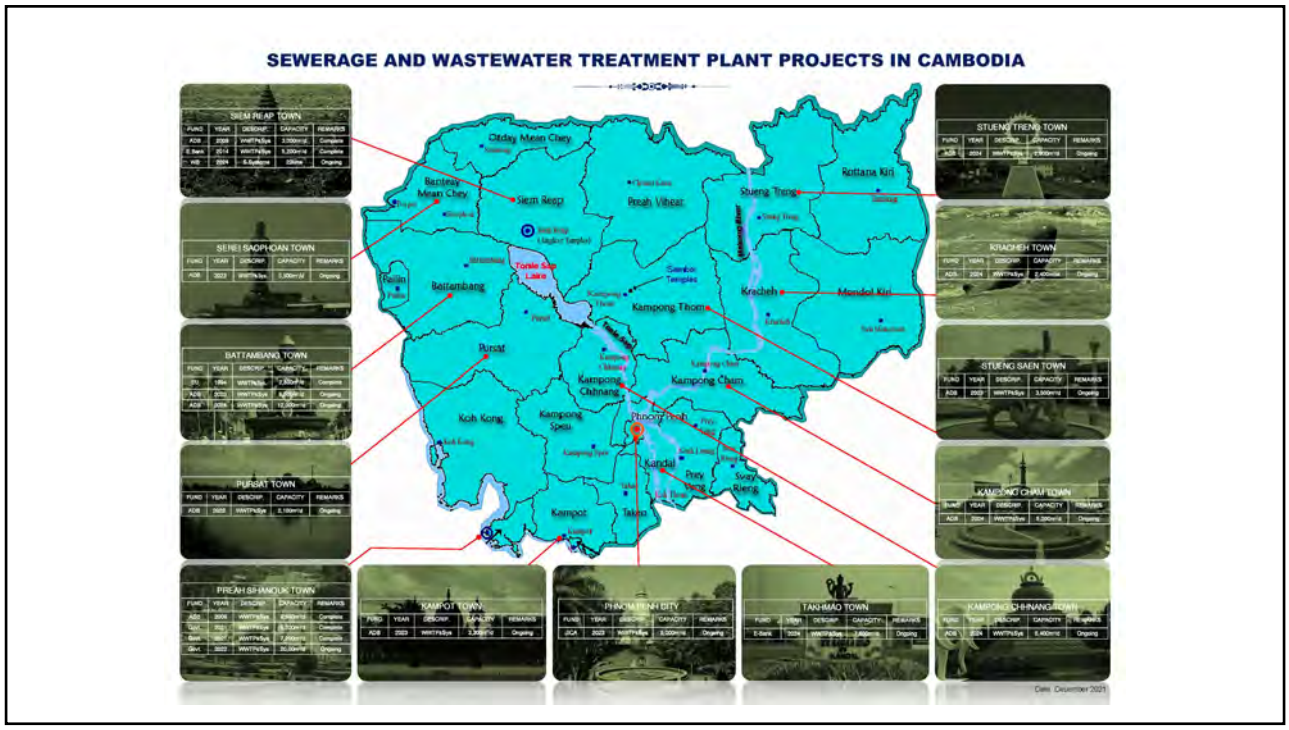


31

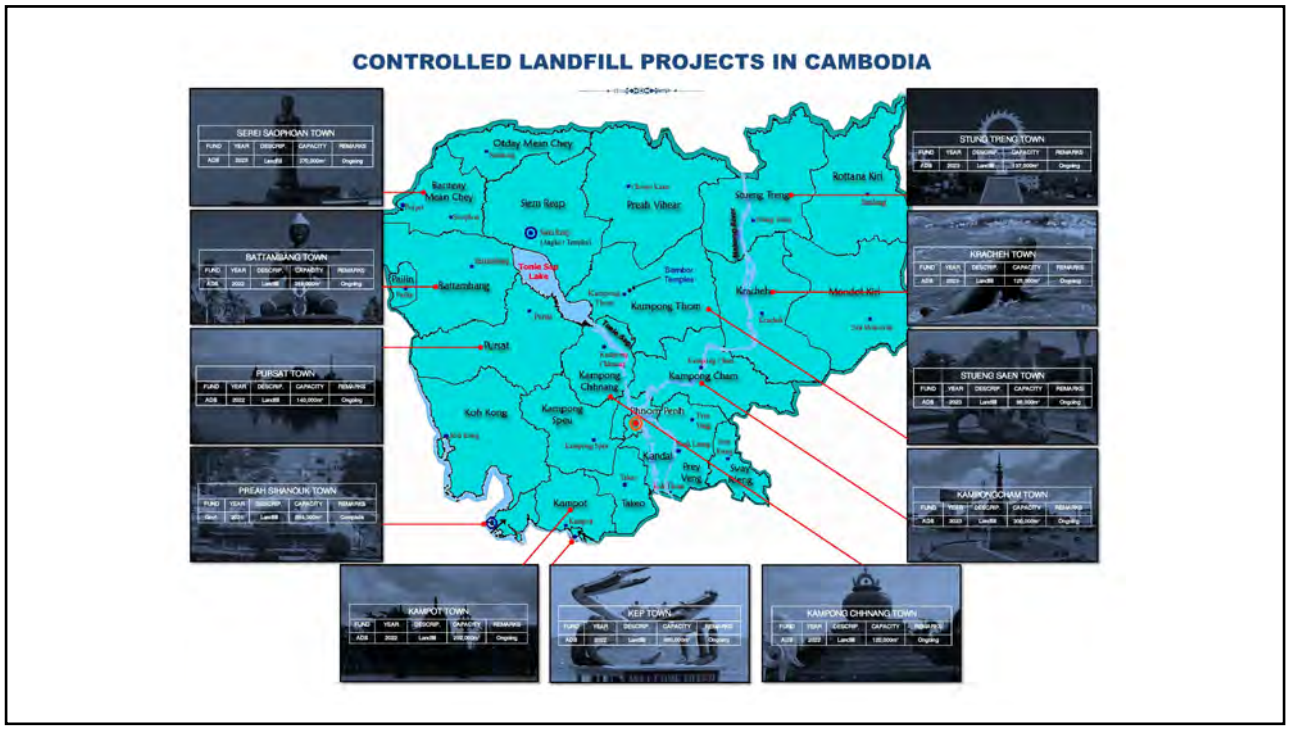
Project Profile

No.	Project Name	Funding Agency	Loan Amount for Civil Works only	Project Cover Area	Loan Agreement Year	Completion Year
1	Emergency Rehabilitation Project for Water Supply and Sanitation.	EU	Grant (N.A)	Cover around 200 ha in Western Part of Battambang Town.	1992	1994
2	Provincial Towns Improvement Project, (Part C: Wastewater Management System, and Part D: Local Governance and Resource Mobilization.	ADB Loan No.: 1725 - CAM (SF) and 2013 - CAM (SF)	USD 11.19 M	Cover an area of 221.5 ha with 3,368 service connections in Sihanoukville	2000	2007
3	Mekong Tourism Development Project, Part A1: Siem Reap Wastewater Management System	ADB Loan No.: 1969 - CAM (SF)	USD 14.37 M	About 530 ha, Central Western Part of Siem Reap Town	2003	2009
4	Siem Reap Urban Development Project Drainage & Wastewater Master Plan Study, Priority Works	AFD, French	Grant:US$4 M	Eastern Part Drainage of Siem Reap Town	2008	2009
5	Siem Reap Sewerage System and Improvement of Siem Reap River	Korea Eximbank	USD 26 M	Cover of 934 ha (East 365ha+ West 569ha) in Siem Reap	2011	2014
6	GMS: Southern Economic Corridor Towns Development	ADB	USD 55 M	Cover Bavet, Neak Loeun, Battambang & Poipet Town	2014	2022
7	Integrated Urban Environmental Management in the Tonle Sap Basin	ADB	USD 52 M	Cover Pursat & Kampong Chhnang Town	2016	2024
8	GMS: Second Corridor Towns Development	ADB	USD 38 M	Cover Sihanoukville	2016	2023
9	Improvement of Siem Reap River Phase II Project	Korea Eximbank	USD 13 M	Siem Reap Town	2016	2024
10	Provincial Water Supply & Sanitation Project	ADB/AFD	USD 66 M	Sihanoukville, Battambang, Siem Reap & Kampong Cham	2017	2024
11	Ta Khmau Sewerage System	Korea Eximbank	USD 64 M	Ta Khmau Town	2017	2024
12	Fourth GMS Corridor Towns Development	ADB	USD 88 M	Kampong Cham, Kratie & Stung Treng Town	2019	2025
13	Integrated Urban Environmental Management in the Tonle Sap Basin II	ADB	USD 87 M	Cover Battambang, Serei Saophoan & Steung Sen Town	2019	2025
14	Livable Cities	ADB	USD 180 M	Kampot, Bavet & Poipet Town	2022	2027
15	Sihanoukville Sewerage Management	National Budget	USD 60 M	Sihanoukville (additional two WWTP)	2019	2021

32


SEWERAGE AND WASTEWATER TREATMENT PLANT PROJECTS IN CAMBODIA
SIEM REAP TOWN
SEREI SAOPHOAN TOWN
BATTAMBANG TOWN
PURSAT TOWN
PREAH SIHANOUK TOWN
KAMPOT TOWN
PHNOM PENH CITY
TAKHMAO TOWN
KAMPONG CHHNANG TOWN
STUENG TRENG TOWN
KRACHEH TOWN
STUENG SAEN TOWN
KAMPONG CHAM TOWN
Otdey Mean Chey
Banteay Mean Chey
Siem Reap
Preah Vihear
Stueng Treng
Rottana Kiri
Tonle Sap Lake
Battambang
Kampong Thom
Kracheh
Mondol Kiri
Pursat
Kampong Chhnang
Kampong Cham
Koh Kong
Kampong Speu
Phnom Penh
Kandal
Prey Veng
Svay Rieng
Kampot
Takeo

33


CONTROLLED LANDFILL PROJECTS IN CAMBODIA
SEREI SAOPHOAN TOWN
BATTAMBANG TOWN
PURSAT TOWN
PREAH SIHANOUK TOWN
KAMPOT TOWN
KEP TOWN
KAMPONG CHHNANG TOWN
STUNG TRENG TOWN
KRACHEH TOWN
STUENG SAEN TOWN
KAMPONGCHAM TOWN
Otdey Mean Chey
Banteay Mean Chey
Siem Reap
Preah Vihear
Stueng Treng
Rottana Kiri
Tonle Sap Lake
Battambang
Kampong Thom
Kracheh
Mondol Kiri
Pursat
Kampong Chhnang
Kampong Cham
Koh Kong
Kampong Speu
Phnom Penh
Kandal
Prey Veng
Svay Rieng
Kampot
Takeo

34

Possible Solution

- Master plan for the wastewater management & related basic infrastructure of each urban area and towns throughout the country is urgently required.
- Establishment of legislation and laws for wastewater management institutions for the empowerment/ enforcement, Capacity building and resources mobilization.
- Sewage effluent & water bound monitoring
- Encouragement of Private Sector Participation.

35

Thank you

36

FIFTH MEETING
GMS Urban Development Working Group
23 FEBRUARY 2022

Country Presentation: People's Republic of China

37

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GMS Urban Development Working Group
7 DECEMBER 2021

智慧管理在城市供水中的应用

Application of intelligent management in urban water supply

中国 住房和城乡建设部城市建设司水务处
Water Division, Urban Development Department of the Ministry of Housing and Urban-Rural Development of China

38

提纲（Contents）

FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

39

一、相关法规、政策和标准

Relevant regulations, policies and standards

FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

40

《水污染防治法》（1984年发布，1996、2008、2017年修订）

《Law of the People’s Republic of China on Prevention and Control of Water Pollution》(promulgated in 1984, amended in 1996, 2008, 2017)

□饮用水供水单位应当对供水水质负责，确保供水设施安全可靠运行，保证供水水质符合国家有关标准。
Water plants shall be responsible for the quality of water supply, guarantee the safe and reliable operation of water supply facilities, and ensure that the quality of water supply complies with the relevant national standards.

□县级以上地方人民政府应当组织有关部门**监测、评估本行政区域内饮用水水源、供水单位供水和用户水龙头出水的水质等饮用水安全状况。**
The people's governments at or above the county level shall organize relevant departments to monitor and evaluate the safety of drinking water in their respective administrative regions, such as the quality of the source of drinking water, the water supplied by water supply units and the tap water.

《城市供水条例》（国务院令，1994年10月1日起施行）

《Regulations of urban water supply》(Decree of the State Council of the People’s Republic of China, effective from and after October 1,1994)

□城市供水的水质符合国家规定的饮用水卫生标准，供水管网的压力符合国家规定的标准。
The water quality of urban water supply shall comply with the national standards for drinking water quality, and the pressure of water supply network shall meet the national standards.

□禁止擅自停止供水。
It is forbidden to stop water supply without authorization.

FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

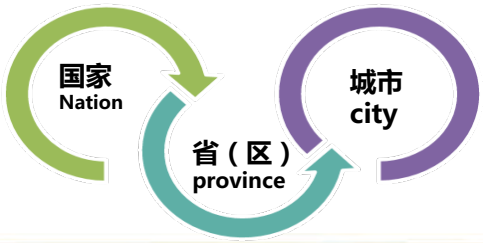
41

《城市供水水质管理规定》（住房城乡建设部令，1994年10月1日施行）

《Administration of Water Quality in Urban Water Supply》(order of the Ministry of Housing and Urban-Rural Development, effective from and after October 1,1994)

□城市供水水质应当符合国家有关标准的规定。
The water quality of urban water supply shall comply with the provisions of relevant nation standards.

□国务院建设主管部门，省、自治区建设主管部门以及直辖市、市、县人民政府城市供水主管部门应当建立健全城市供水水质检查和督察制度。
The Ministry of Construction, the development departments of provinces, and the competent urban water supply departments of municipalities, cities shall establish and improve the inspection and supervision system of urban water supply quality.



FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

42

《生活饮用水卫生标准》GB5749（1985→2006→2022/3年）

Standards for drinking water quality-GB 5749（1985→2006→2022/3）

water quality testing　　106 indicators

Water sample category　indicators　Frequency

水样类别	检 验 项 目	检验频率
水源水	浑浊度、色度、臭和味、肉眼可见物、COD_{Mn}、氨氮、细菌总数、总大肠菌群、耐热大肠菌群	每日不少于一次
	GB 3838 中有关水质检验基本项目和补充项目共 29 项	每月不少于一次
出厂水	浑浊度、色度、臭和味、肉眼可见物、余氯、细菌总数、总大肠菌群、耐热大肠菌群、COD_{Mn}	每日不少于一次
	表 1 全部项目，表 2 中可能含有的有害物质	每月不少于一次
	表 2 全部项目	以地表水为水源：每半年检测一次 以地下水为水源：每一年检测一次
管网水	浑浊度、色度、臭和味、余氯、细菌总数、总大肠菌群、COD_{Mn}（管网末梢点）	每月不少于两次
管网末梢水	表 1 全部项目，表 2 中可能含有的有害物质	每月不少于一次

注：当检验结果超出表 1、表 2 中水质指标限值时，应立即重复测定，并增加检测频率。水质检验结果连续超标时，应查明原因，采取有效措施，防止对人体健康造成危害。

FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

43

二、智慧管理在中国供水行业应用

Application of intelligent management in China's water supply industry

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44

Phase 0: 1950-1978

- 自来水厂多使用水力混凝、重力无阀滤池

Water plants mostly used hydraulic coagulation and gravity valveless filter

- 信息化应用较少

There was basically no informatization application

Technological Progress Development Plan for Urban Water Supply Industry by 2000
(Issued at 1993)

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45

Phase 1: 1979-2006

生活饮用水卫生标准
GB 5749- **1985**
Hygienic standard for drinking water, 2006

- 智慧管理初步应用阶段

Initial application phase

- 1985年标准：确定了35项指标，关注基本感官性状指标、微生物

1985 standard: 35 indicators were determined, focusing on the indicators of basic sensory traits and microorganisms

- 自来水工艺：发展了以除浊、消毒为主的常规技术工艺

Water treatment process: the conventional technical process focusing on turbidity removal and disinfection

- 信息化、自动化技术在供水上开始应用，混凝实现自动加药，快滤池、V型滤池推行使用，实现周期性自动反冲洗。

Informatization and automation technology have been applied in water supply, automatic dosing of coagulant has been realized, and fast filter and V-shaped filter have been put into use to realize periodic automatic backwashing.

FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

46

Phase 2: 2006-2020

2010 technical progress development plan and 2020 long-term goals of urban water supply industry
(Issued at 2005)

Standards for drinking water quality, 2006

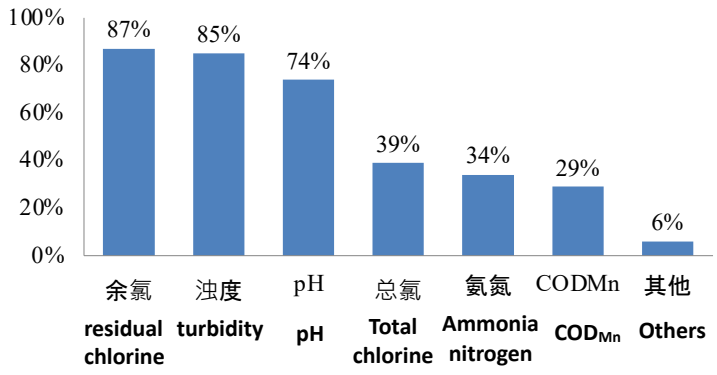
FIFTH MEETING GMS Urban Development Working Group 23 FEBRUARY 2022

47

Phase 2: 2006-2020

- 2006年生活饮用水卫生标准：106项指标

Standards for drinking water quality in 2006: 106 indicators



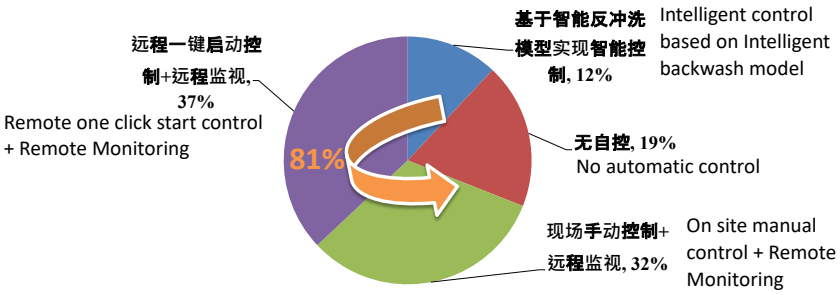
供水企业在线仪表监测水质指标现状—中国水协抽样调查数据
Current situation of water quality indicators monitored by on-line instruments in water supply enterprises -- sampling survey data of *China Urban Water Supply and Drainage Association*

48

Phase 2: 2006-2020

□自动化技术下实现超滤膜的频繁自动反冲洗，促进了超滤膜净水工艺推广

Under the automation technology, the frequent automatic backwashing of ultrafiltration membrane is realized, which promotes the popularization of ultrafiltration membrane in water purification process



企业滤池反冲洗的控制方式– 中国水协抽样调查数据

Control mode of filter backwashing in Enterprises -- sampling survey data of *China Urban Water Supply and Drainage Association.*

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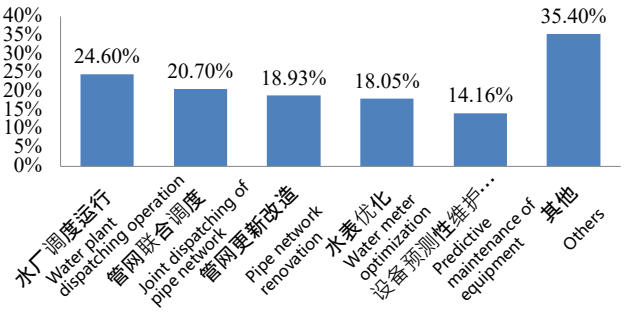
49

Phase 2: 2006-2020

□信息化、自动化、数字化、智能化技术在**供水管网精细化管理**方面发挥重大作用，包括分区计量管理，SCADA系统，实时水力水质模型的应用等。Information, automation, digitization and intelligence technologies play an important role in the **fine management of water supply network**, including zoning metering management, SCADA system, application of real-time hydraulic water quality model, etc.



供水企业实现数据支持决策情况- —中国水协抽样调查数据

Implementation of data support decision-making by water supply enterprises -- sampling survey data of *China Urban Water Supply and Drainage Association*

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50

Phase 3: 2021-future

Outline of the 2035 Industry Development Plan for Urban Water Affairs
by China Urban Water Supply and Drainage Association,2020

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51

《关于加快推进新型城市基础设施建设的指导意见》（2021年，住房和城乡建设部等联合发布）

Guiding opinions on accelerating the construction of new urban infrastructure (jointly issued by MOHURD, etc., in 2021)

□对城镇供水等市政基础设施实施智能化建设、改造和管理，提高运行效率和安全性能

Implement intelligent construction, transformation and management of municipal infrastructure such as urban water supply to improve operation efficiency and safety performance

- 开展市政基础设施普查，摸清现状底数，明确**智能化建设和改造任务**

Carry out a general survey of municipal infrastructure, find out the current situation, and clarify the **tasks of intelligent construction and transformation**

- 推进**智能化感知设施**建设，实现运行数据的全面感知和自动采集

Promote the construction of **intelligent sensing facilities** to realize the comprehensive sensing and automatic collection of operation data

- 对运行数据进行**实时监测、模拟仿真和大数据分析**，实现**预警和应急处置**

Conduct real-time **monitoring, simulation and big data analysis** on operation data to realize early warning and emergency disposal

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52

《关于加强公共供水管网漏损控制的通知》（2022年住房城乡建设部、发展改革委发布）

Notice on strengthening leakage control of public water supply network (issued by the Ministry of Housing and Urban-Rural Development and National Development and Reform Commission in 2022)

开展供水管网智能化建设工程
Carry out the intelligent construction project of water supply network

建立基于物联网的供水智能化管理平台
Establish an intelligent water supply management platform based on internet of things

- 完成供水管网信息化 Informatization
- 实施智能化改造 Intelligent transformation
- 管网建设、改造同步敷设有关传感器 Relevant sensors

提高城市供水管网漏损控制的信息化、智慧化管理水平
Improve the information and intelligent management level of leakage control of urban water supply network

- 实时监测设施运行状态和水量、水压、水质信息 Real time monitoring
- 精准识别管网漏损点位 Accurate identification
- 进行管网压力区域智能调节 Intelligent regulation

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53

□ 案例——浙江市绍兴市管网精细管理+漏损控制

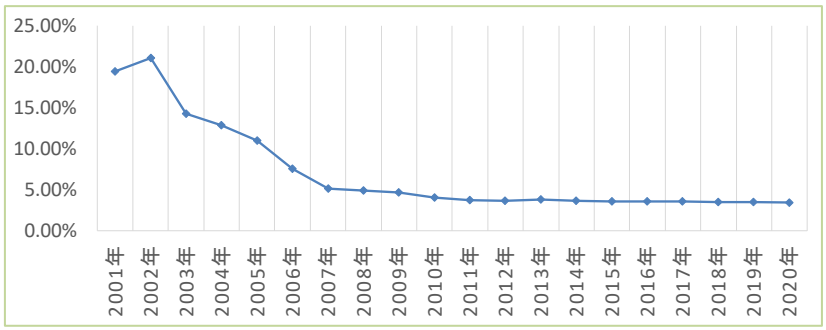
Case study- pipe network fine management + leakage control in Shaoxing City, Zhejiang Province

□绍兴市：服务人口约170万人，用户约100万户。

Shaoxing City: the service population is about 1.7 million and the users are about 1 million.

□漏损率从2000年的20%，降到2012年的5%，并保持＜5%

The leakage rate decreased from 20% in 2000 to 5% in 2012 and remained below 5%.



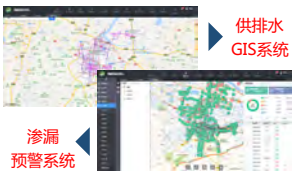
绍兴市供水管网漏损率变化（2001-2020）
Change of leakage rate of water supply network in Shaoxing City

54

一个管理平台 + 九大业务系统
One management platform + nine business systems

智慧供排水一体化平台
Intelligent water supply and drainage integrated platform

管网GIS系统 Pipe network GIS	调度SCADA系统 Dispatching SCADA	分区计量系统 Zoning measurement	
营业管理系统 Business management	热线呼叫系统 Hotline call	管网巡检系统 Pipe network inspection	
二次供水系统 Secondary water supply	水力模型系统 hydraulic model	渗漏预警系统 Leakage warning	



供排水GIS系统

渗漏预警系统

构建技术与管理相协同的业务驱动型供排水智能化漏控长效管理体系
Business driven intelligent leakage control long-term management system for water supply and drainage based on the coordination of technology and management

提高企业精细化管理水平，实现提质增效保安全的管理目标
Improve the fine management level of enterprises and realize the management goal of improving quality, increasing efficiency and ensuring safety

供排水管网数据覆盖率100%，准确率95%以上，管网漏损率连续十余年5%以下
The data coverage rate of water supply and drainage pipe network is 100%, the accuracy rate is more than 95%, and the leakage rate of pipe network is less than 5% for more than ten years

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55

56

三、积极推动国际合作

Promote international cooperation

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57

科技产品国际合作，推动全球互惠共享

International cooperation in scientific and technological products to promote global mutual benefit and sharing

- 中国科技成果与产品服务“一带一路”沿线国家，通过交流与合作，解决了这些国家水务方面的难题，比如帮助斯里兰卡解决当地饮用水净化不充分导致肾病的难题。

China's scientific and technological achievements and products provide services to the Belt and Road countries through exchanges and cooperation, which solved the water problems of these countries, such as helping Sri Lanka solve the problem of kidney disease caused by inadequate local drinking water purification.

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58

- 柬埔寨：水质监测设备 Cambodia: water quality monitoring equipment
- 伊朗：雨水收集、水质监测设备 Iran: rainwater collection and water quality monitoring equipment
- 肯尼亚：臭氧发生器应用 Kenya: ozone generator application
- 孟加拉：地下水除砷技术与产品 Bangladesh: arsenic removal technology and products from groundwater
- 缅甸：水源地构建修复技术与服务 Myanmar: water source construction and restoration technology and services
- 斯里兰卡（中斯水中心）：水质监测设备 Sri Lanka (China Sri Lanka Water Center): water quality monitoring equipment

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59

谢谢！
Thanks

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60

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Country Presentation: Lao People's Democratic Republic

61

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Country Presentation LAO PDR

62

BACKGROUND

- The water supply sector is generally very young, especially in the provinces;
- The majority of cities and towns supplied with water has only happened within the last decade or so;
- Even though there is an ongoing effort to build capacity, the provincial water supply utilities are still considerably weak;
- The emphasis so far therefore, has been on implementing systems using appropriate, robust and proven technologies;
- Limited technical support services for O&M of hi-tech equipment;
- But we have been keeping an eye on the future, and we have been thinking about *smarter* ways of doing things in recent years.

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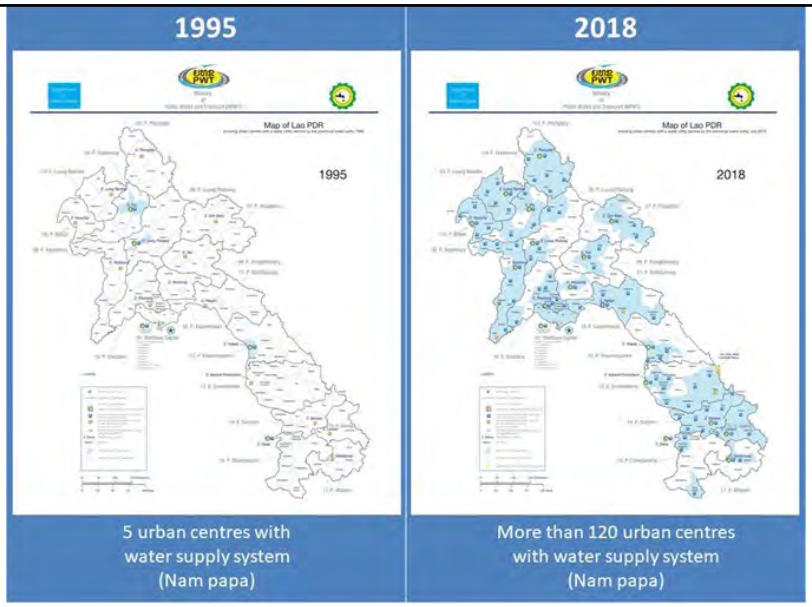
63



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64

HISTORICAL PERSPECTIVE

- Water Supply Law (2009) approved to shape and guide the sector for the future – replaced 37/PM and 191/PM;
- Enterprise Law (2005) introduced to define the legal framework for the operation of state-owned enterprises – update in 2013;
- Decree 191/PM (2005) approved aimed at setting up a regulatory framework;
- Decree 37/PM (1999) approved to set out the structure of the sector and institutional responsibilities;
- Sector reform program launched in 1999 with decentralization of sector.

65

KEY ASPECTS OF SECTOR REFORM

- In 1999, the water utilities had very limited capacities and resources:
- Capital investment was totally subsidized;
- O&M was either subsidized or "deferred";
- Highest priority – to generate greater revenues, improve performance and minimize costs;
- Tariff reform commenced in 2008 to generate greater levels of revenue;
- Attempts to improve performance started in 2010 with the introduction of KPIs;
- More effective management of the higher levels of revenue started in 2012 through corporate planning

66

SECTOR INITIATVES

We have put a significant effort into estbalishing suitable legal and instituional frameworks over the past 20 years:

- Initially, secondary legislation (decrees) was introduced to meet the short- to medium-term needs of the sector;
- Decrees to provide institutional clarity were introduced;
- Decrees to support the estbalishment and pilot testing of a regulatory office;
- Service Agreements to provide an additional level of regulation;
- Provincial water utilities are gradually being transfromed from government units to State-Owned Enterprises (SOEs);
- The Enterpirse Law (2013) helps guide the SOEs in operating as corporate entities or businesses.

67

SECTOR INITIATVES

The SOEs have generally had a cadre of technically skilled people – but the development of good accounting skills and business acumen has been and continues to be a serious challenge:

- There has been an ongoing capacity development effort to build these skills in staff and senior management;
- There has also been an ongoing commitment to making the Boards of Directors more aware of their role in maintaining good corporate governance;
- To miminize and eliminate state subsidies, a tariff policy was introduced in 2004 to help guide the SOEs in maintaining adequate levels of cost recovery;
- An updated policy and set of tariff determination guidelines is now in draft format, and expected to be approved within 2022;
- External donors such as ADB have helped to improve the financial position of the SOEs by setting minimum standard loan covenants – meet all O&M costs and deb service coverage ratios >1.2.

68

SECTOR INITIATVES

With assistance from ADB, the concept of corporate planning was first pilot tested in 2009. Soon after, it was adopted for all SOEs receiving concessional financial assistance:

- A corporate plan is prepared over a 3-5 years' period;
- Based on demographic and consumption projections;
- Covers all O&M expenses and debt obligations;
- Revenues based on water bills and tariff levels;
- Identifies the tariff levels required over the planning period to meet all commitments and remain sustainable.

Common Issues identified

- Tariff adjustments remain a "considerably Sensitive matter" ;
- High accounts receivable – some are in fact "bad debt" and need to be written off;
- SOEs lack of business knowledge at this stage does not allow the corporate plan to be fully and effectively utilized in the management of the operation.

69

SMART WATER INITIATVES

A few words about *Smart Water* in Lao PDR:

Working from a low base, with limited capacity, and new initiatives need to be practical and introduced in a strategic way. Nevertheless:

- Over the last 10-15 years, we have been looking at more automated treatment plant operation - pumping, storage and treatment are automatically controlled in accordance with demand – simple sensor controls in storage tanks, but effective and inexpensive;
- Semi-automatic operation of back washing of rapid sandfilters with electronic actuators have been installed in the provincial WTP recently;
- All recent water supply systems have elctronic master water meters at WTP and distribution networks with District Metered Areas (DMA) single supply with a water meter for effective moitoring and management of Non-Revenue Water (NRW);
- Under the WSSP a NRW Task Force for provincial towns equipped with leak detection equipment will be trained.

70

SMART WATER INITIATVES

- CCTV installed at the treatment plant and intake – offers senior operators the opportunity to monitor rapid changes in raw water quality and adjust chemical dosing at the WTP and also activities at the treatment plant from their remote computers or mobile phones;
- Variable speed pumping has been introduced on many new distribution systems to minimize pressures (reduce NRW) in the system and reduce pumping costs;
- In Luang Prabang one WTP has been constructed using BOT by a Thai investor, with a Supervisory Control and Data Acquisition (SCADA) system enabling operation and monitoring of the process via internet;
- Many SOEs now allow payment of water bills by mobile phone;
- Using NPL on mobile.

71

SMART WATER INITIATVES

***Smart Water* in the Future?**

- Turning to Smarter water metering in some systems, linked to the billing systems;
- More at SCADA systems on some of the larger and more complex water supply systems – 2 provincial systems now under implementation;
- Working closer with tertiary education institutes to produce graduates more suitable for the sector;
- Continue to build awareness of the laws, and the roles and functions of stakeholders such as Ministry of Finance, Provincial Government, Boards of Directors, Senior Management and staff, as well as consumers.

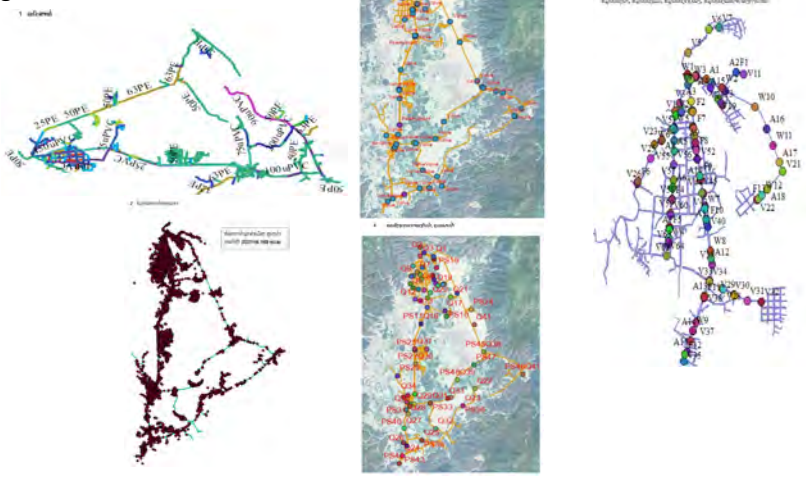
72

SMART WATER INITIATVES

***Smart Water* in the Future?**

- GIS-based asset maintenance and managmenet systems – we have taken some preliminary steps in this area with help from World WaterNet Amsterdam;

Luang Nam Tha Province:



73

THANK YOU FOR YOUR ATTENTION

74