



SMART WATER UTILITY TRAINING IN MACAO

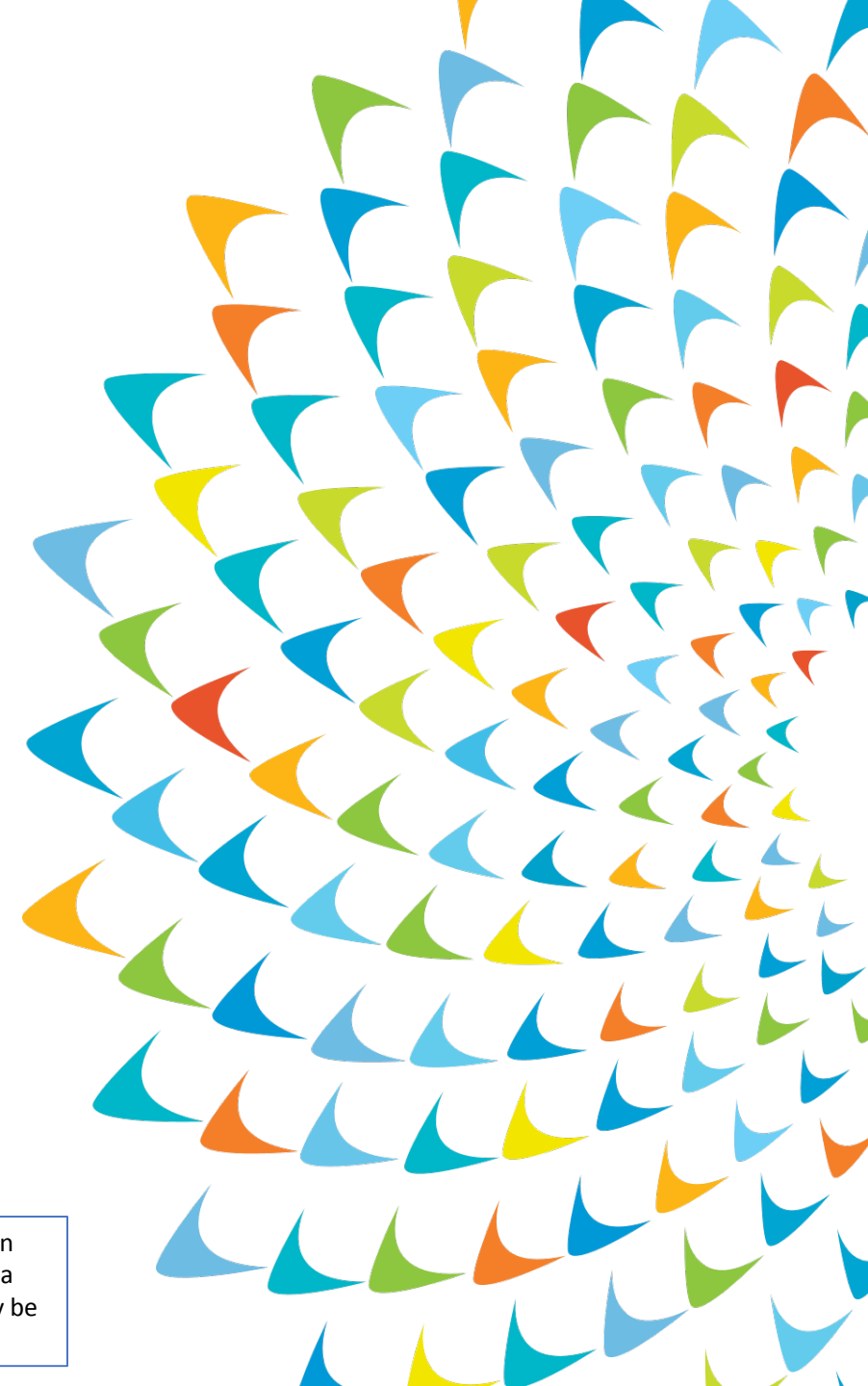
April 2019



Brownbag in HQ, Manila

28 May 2019

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Smart Water Utility Training

Objectives:

- The training aimed to develop ADB projects officers understanding of a modern water utility operational management integrating advanced smart systems

Background:

- This is important to ADB in the scope of S2030 'Livable Cities' as it showcase utility transformation, PPP, technology,
- This is relevant to ADB operations to support new loans for O&M and capacity building,
- A total of 12 ADB staff joined the training.



Training content

Program:

- The training was held from 8-12 of April in Macao Water headquarters, People's Republic of China
- ADB, Suez, and the Macao Water Company (under USG Continuous Learning Development Program)
- Macao Water is a recognized leader in smart water supply systems and asset management
- Focus on efficient water utility operations and use of smart solutions, raw water and production, nonrevenue water and network management, and customer services



HQ and RM
CWRD, SERD, SARD, SDCC participants,
Macao Water management,
Regulators.



MACAO



Location: South of China (next to Hong Kong)

Population: 667,400

Area: $\approx 31 \text{ km}^2$

Major Industry : Tourism & Gaming

Visitors : $\approx 36 \text{ M}$ (2018)

GDP per capita : $\approx \text{USD}82,000$

Moody's credit rating = "Aa3"



MACAO WATER



Established in 1935

No. of employee : 254

Customers: 247,612

3 Water Treatment Plants + 1 Under Construction SPV

Water Supply: 390,000 m³

Macao Water Company

Operational Model :

Water supply service in Macao operates under a PPP model

- Macau S.A.R. grants by the contract to Macao Water the exclusive right to the public utility service of supplying water in the Macau S.A.R.



1985

- Signed the Concession Contract with Macao Water (25 years: from 8th July 1985 to 7th July 2010)

2009

- Signed the extension of Concession Contract with Macao Water (20 years: from 8th July 2010 to 7th July 2030)



Macao Govt is responsible for the purchase of raw water and Macao Water is responsible for supervision on the raw water quality and quantity

MW has the exclusive right to the public utility service of supplying water in the Macau S.A.R.
MW is obliged to satisfy the water quality and quantity and responsibility for the operation, maintenance and renovation of water facilities within Macao territories.

PPP contract includes operation of service, fees and tariffs, supervision, accounts, quality standards and KPIs, penalties and review, master plan, investment plan, litigation, end of contracts terms for assets etc ...

Concession supervision

Stakeholders

Government and Supervisor

供優質食水 創優質生活
More than Quality Water We Deliver Quality of Life

Entities	Regulatory issues
All Government Departments	Compliance with Laws and Regulations
Supervisor (Marine and Water Bureau)	Monitor the quality of services provided by the concessionaire to comply with the provisions of the concession contract and to fulfil other obligations of the contract
Government Delegate	responsible for long-term follow-up of the business, with statutory responsibilities and authority in carrying out her duties
Municipal Affairs Bureau (IAM)	Monitor the water quantity and quality according to the requirement and standard in the appendix II of concession contract.





Details of the training :

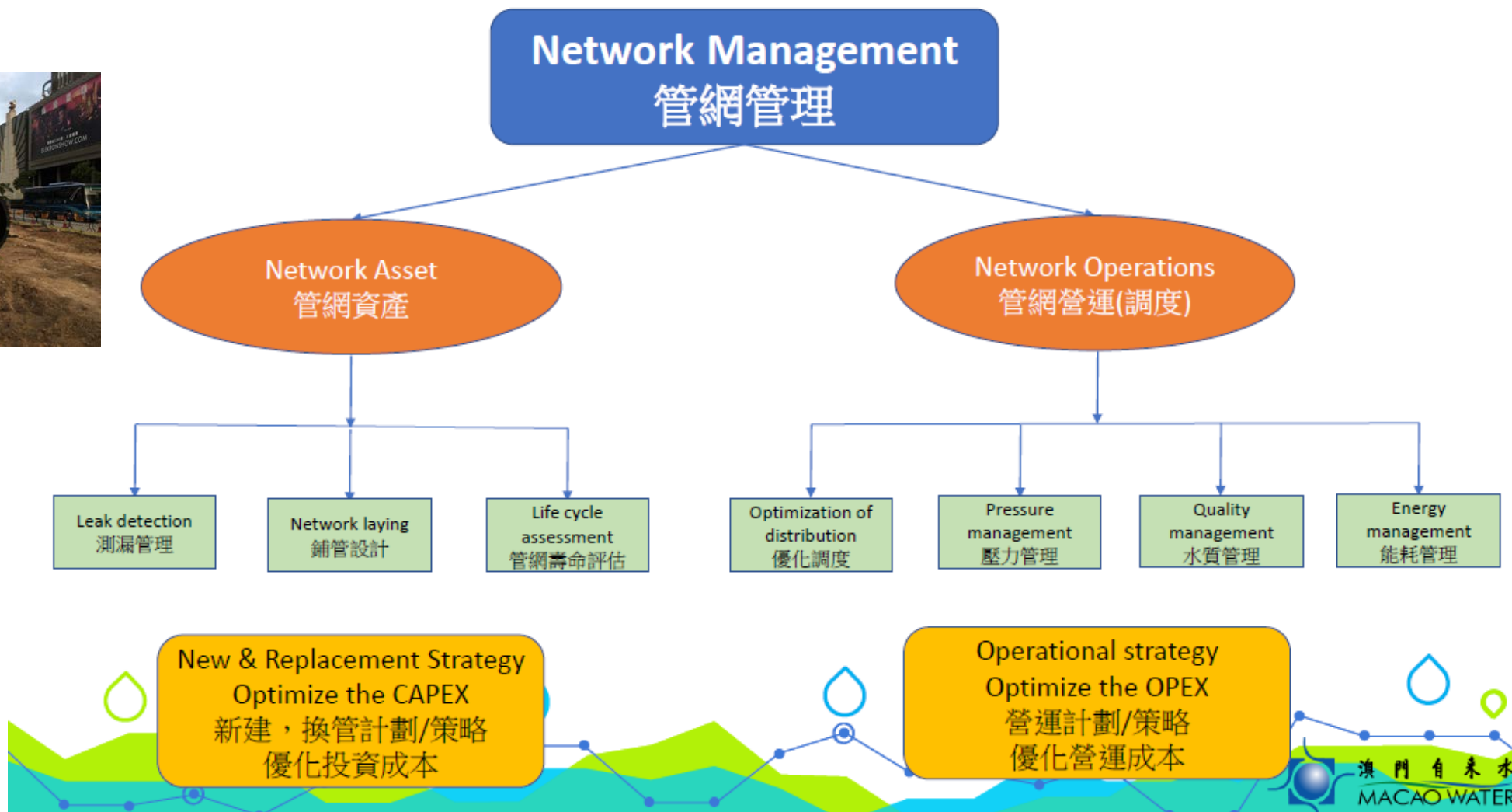
1. Advanced operational practices of a water utility
2. Detail of digitization and smart systems
3. Water production and quality sampling
4. Customers process, AMR, tariffs in PPP scheme
5. Teams incentivization and leadership
6. Site visits, meeting with regulator

(only 1 to 2 will be detailed hereafter, all material is available through USG)



1. Understand the operational practices of an advanced water utility

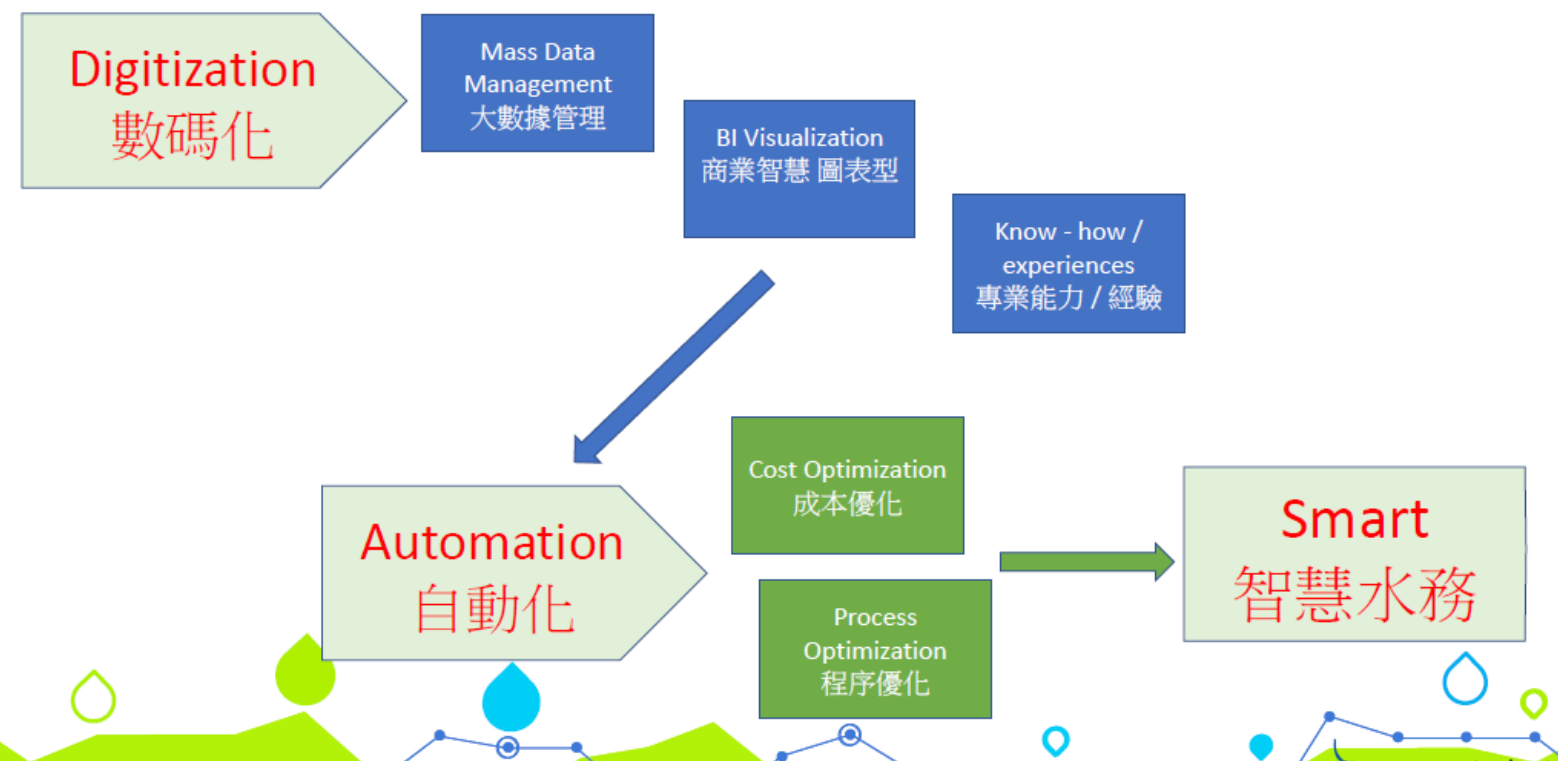
CAPEX and OPEX management practices





2. Understand the key features of smart systems and digital solutions

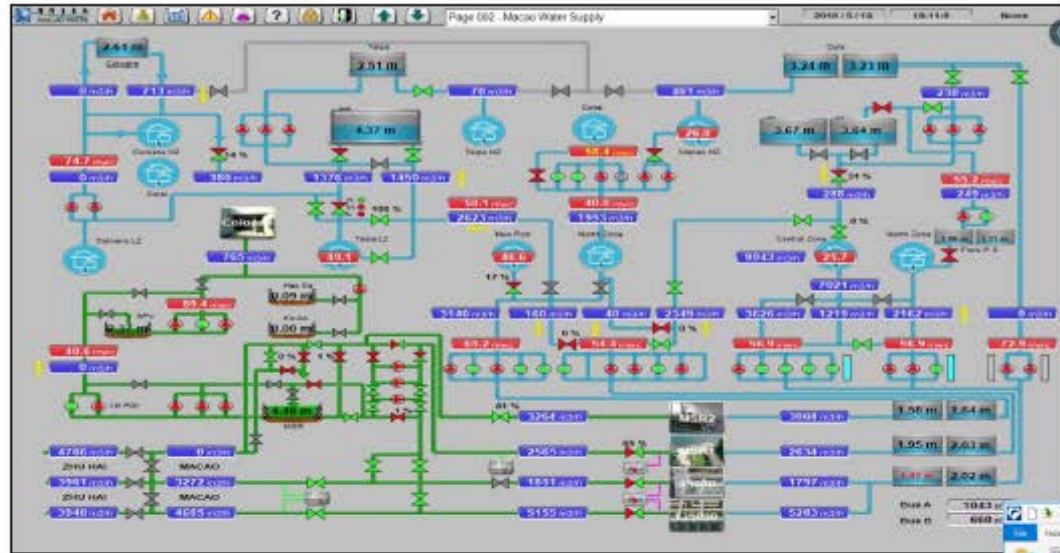
Overview of definition of Smart Evolutions



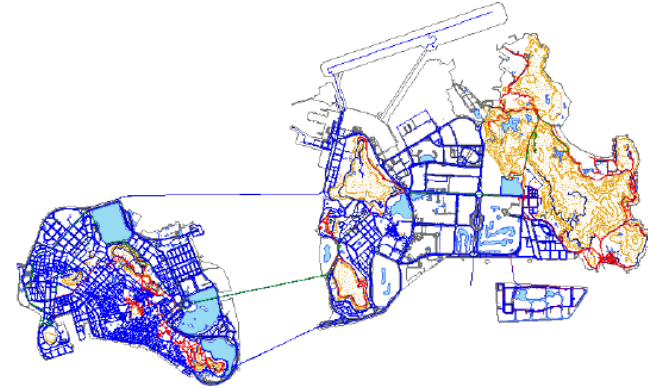


Digitization stage

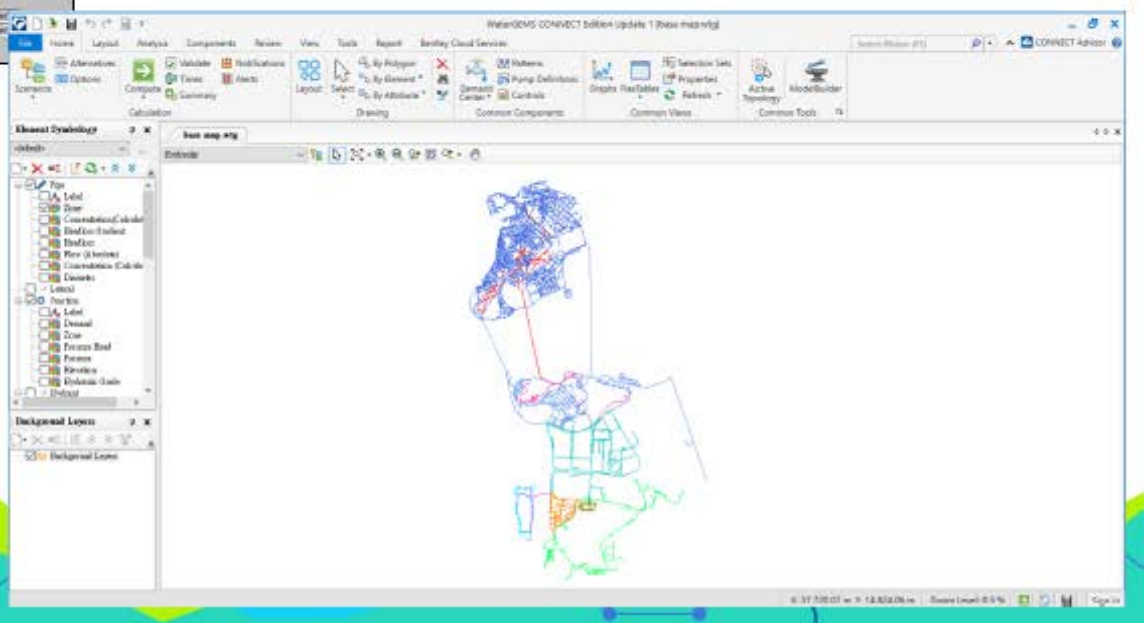
SCADA 供水調度系統



Geographical Information System GIS 澳門地圖信息系統



Hydraulic Model 管網水力模型





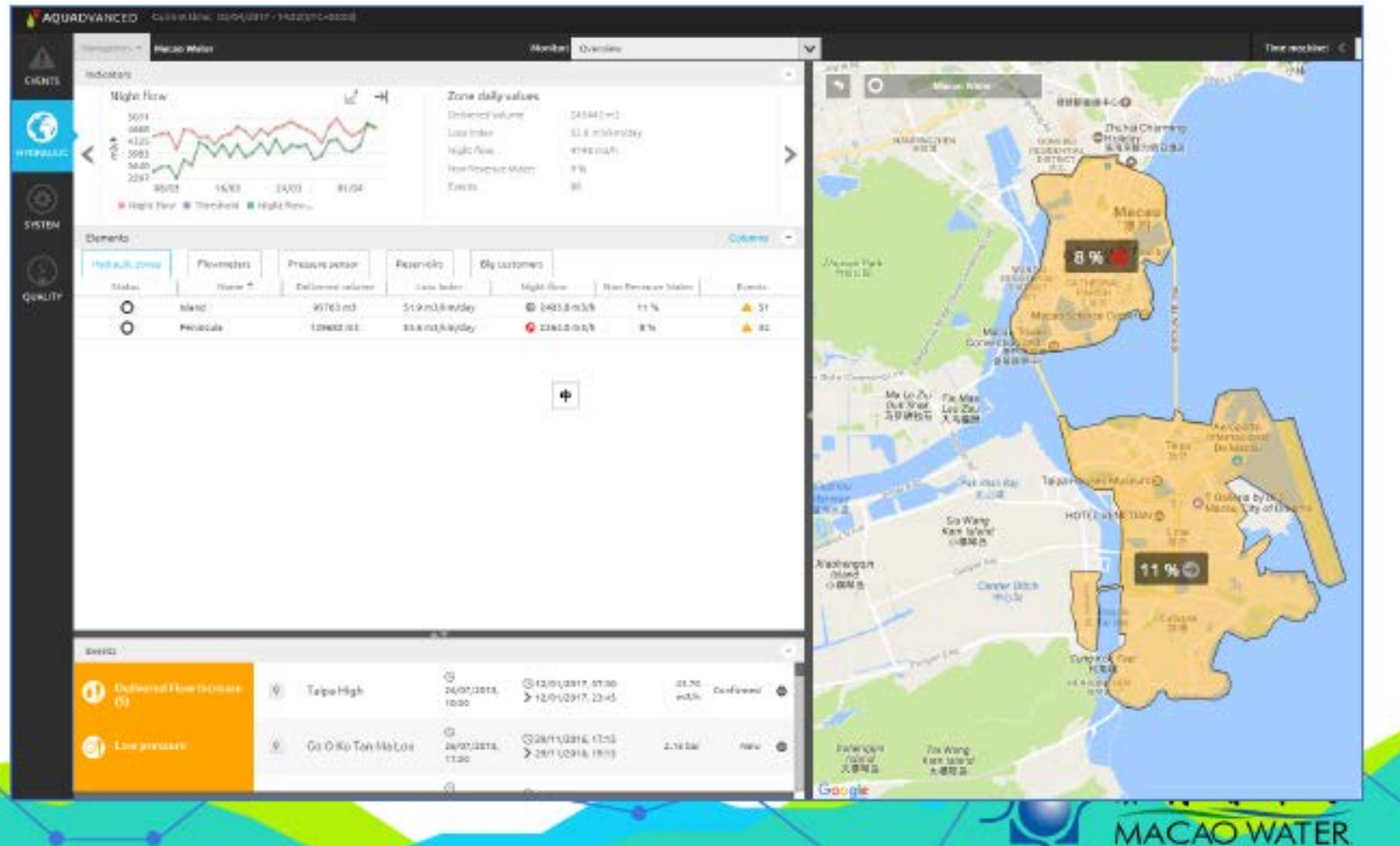
Mass data management principles





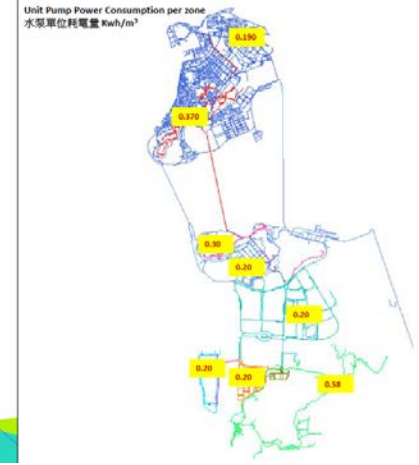
Examples in smart network management

Flow and NRW

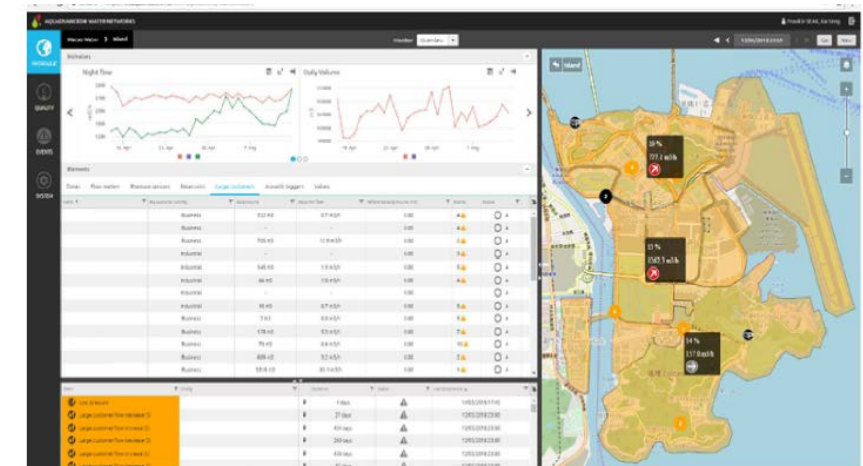


- For Cost analysis/ 能耗管理

Energy cost



Customer (AMR)



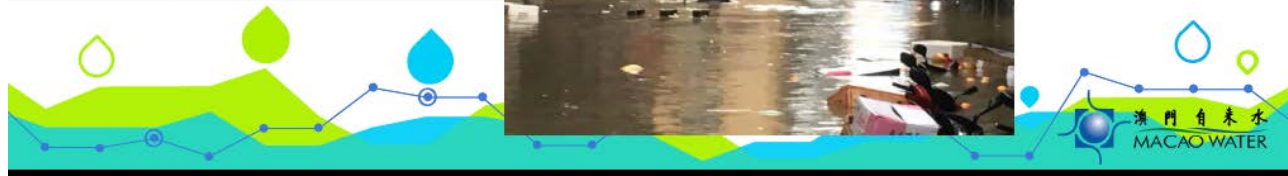


Examples in smart network planning with online calibrated model

- Assist planning of water distribution strategies.

協助制定供水策略

- Case study – Macau Hato Typhoon disaster, 23 August 2017

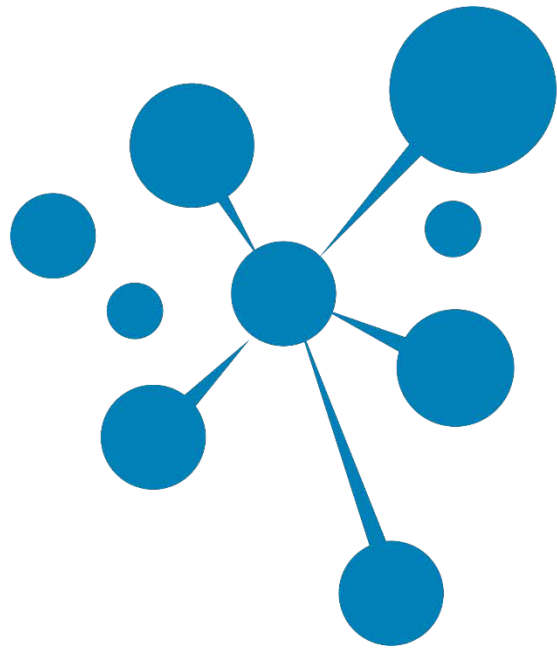


Smart Water Utility Training

Lessons learned :

Smart systems may offer significant **gains** (maintenance cost, energy, water quality, disaster management etc....) when based on :

- **Assets** (GIS) and **operations** dedicated tools (SCADA, hydraulic modeling),
- **Integrated** platform to **produce KPIs**,
- **Strong O&M practices** requiring capacity building, incentivization and leadership,



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