

WaterWise Hong Kong: Application of IoT Technologies and Data Analytics to Address Leakages and Wasteful Use in Commercial Buildings in Hong Kong

**提升商界用水效能：利用物聯網技術及數據分析
解決香港商業大廈的滲漏和浪費用水問題**

by Dr Edith Cheuk Han NGAI

Department of Electrical and Electronic Engineering

(Project No.: KE-SI-2023-24-33)

Strategic Theme(s):

(d) Smart Cities

WaterWise Initiative aims to digitalise water meter data
to help commercial building managers
to detect leaks and high usage activities.

Co-organised by:



Department of Electrical and
Electronic Engineering
電 機 電 子 工 程 系



水資源技術與政策研究中心
Centre for Water Technology and Policy
香港大學 The University of Hong Kong



The WaterWise Initiative is supported by the HKU Knowledge Exchange Fund granted by the University Grants Committee.

Visual Demonstration

Programme Pamphlet

Distributed to 15 property management companies

WaterWise Initiative for Commercial Buildings

Application closes on
30 November 2023

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Project objective

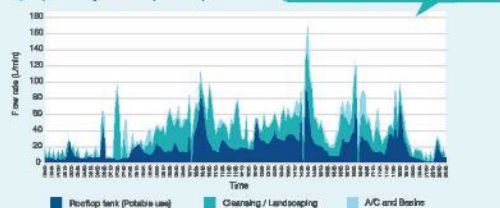
To help commercial building managers to **detect leaks** and **identify high usage activities** by digitalising water meter data.

Why digitalise water meter data?

24-hour fine-grained flow profile



Breakdown by type-of-use (for buildings with multiple meters)



Targeted buildings



Programmatic activities

1 Install smart water meter (March 2024) Retrofit existing water meter



- FAQs**
- Do the devices require water meter or pipe alterations?
No. The devices use a clamp-on, non-invasive design. They retrofit existing water meters and do not require any pipe alterations.
 - Do the devices require power supply from the building?
No. The devices are powered by dry-cell batteries.
 - What assistance is needed from the participants?
Indication of the location of the water meters is needed. Assistance may be required during a step-test to identify the leaking pipes.
 - Is the Water Supplies Department informed about the installation?
Yes. The Water Supplies Department supports this project.
 - Will participants be responsible for the operation and maintenance of the devices?
No. The HKU Water Centre will be responsible for the operation and maintenance of all devices.
 - Is the installation permanent?
No. For premises without any leakages, all devices will be removed after a 2-week data collection period. For premises with leakage issues, the device will remain in place until a step-test is conducted.

2 Data analytics and data visualisation (March – May 2024) Data will be plotted into a 24-hour flow profile



FAQs

- How can participants access the data?
The HKU Water Centre will provide a raw dataset and a summary report to the participants after the data collection period.
- Will the participants' data be kept confidential?
Yes. All the data will be treated with strict confidentiality.

3 Follow-up actions (May 2024) (if leakage is detected)

A step-test would be conducted to identify the leaking pipes.



4 Evaluation workshop (June 2024) Data will be used to formulate effective and targeted water conservation measures

Benefits

- Water and cost savings
- ESG performance enhancement
- Green building certification
- Industry benchmarking

Social Media Engagement

Facebook & Instagram posts

香港大學 - 水資源中心.
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#知識交流：於今年6月總結的「WaterWise提升商界用水效能」計畫，旨在幫助業界找出漏水問題和高用水量活動。參與場地包括8個商場，7幢寫字樓及4間酒店。通過智能水錶收集到的數據，便可掌握到場地的用水規律、高峰時段及用水異常。這些資訊可幫助業界制定更有效，更具針對性的節水策略。

#商業用水 #漏水 #商場 #寫字樓 #酒店

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hkuwatercentre #知識交流：於今年6月總結的「WaterWise提升商界用水效能」計畫，旨在幫助業界找出漏... more

KE Outcomes & Impact

KE outcomes and impact

The WaterWise Initiative is an innovative, one-of-a-kind interdisciplinary collaboration with aims to enhance the commercial sector's understanding of the buildings' water use patterns with the use of smart technologies and to recognise the importance of effective water management in enhancing ESG performance. Spanning from November to June 2024, Dr. Edith Ngai, Project Coordinator and Associate Professor from the Department of Electrical and Electronic Engineering, joined hands with the HKU Water Centre to engage 70 building managers, on-site property managers and on-site engineers from 19 commercial buildings in Hong Kong, including hotels, office buildings and shopping malls, to evaluate the water-use practices in their properties.

Smart Meter Analysers, a clamp-on high-resolution smart meter, invented by the project team were installed in participating buildings to collect round-the-clock usage data. Through hands-on site visits and capacity building workshops, building managers were able to gain a deeper understanding of their facilities' plumbing configurations, water usage behaviours, water efficiency indicators and best practices.

This enhanced knowledge enabled the managers to identify and address a range of issues, from leaks to abnormal consumption. After implementing targeted interventions, such as fixing leakages, maintenance of water tank inlet valves and adjusting the water levels, the project is projected to result in substantial annual water savings of 99,715 cubic meters, corresponding to 67.75 tonnes of reduced carbon emissions. The WaterWise Initiative successfully combined innovative technology and expert knowledge to help the commercial sector improve their Environmental, Social, and Governance (ESG) performance.

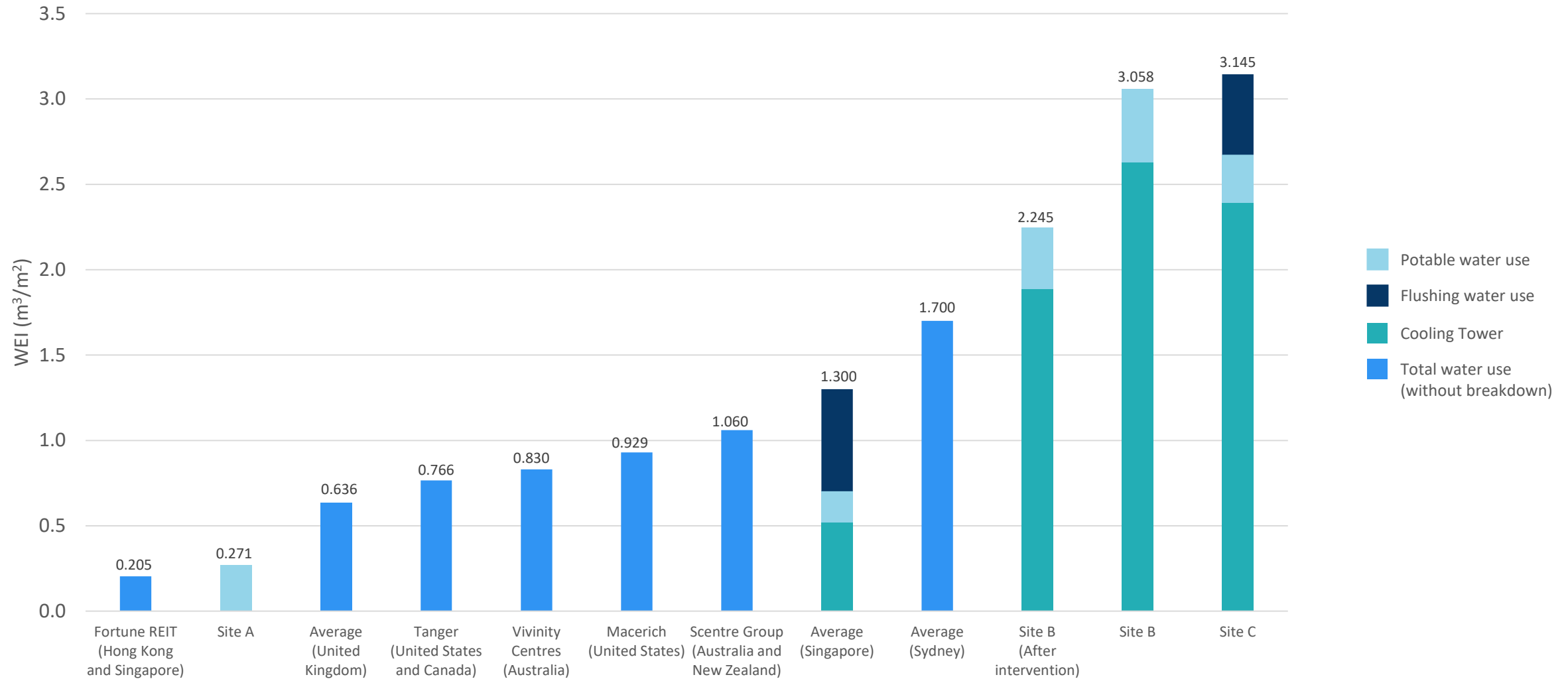
知識交流的成果和影響

「提升商界用水效能」是一項跨學科合作計劃，旨在透過應用創新科技，強化商業大廈的用水管理，從而提升公司的ESG表現。在2023年11月，港大電機電子工程系副教授倪卓嫻博士帶領水資源技中心的團隊，邀請來自19棟商廈（包括酒店、辦公室和商場），共70名物業管理人員及駐場工程師參與計劃。

此計劃利用由團隊研發的智能水錶讀取儀收集全天候用水數據，通過實地考察和工作坊加深了管理人員對管道設施和用水效率的認識，及解決了漏水和用水異常問題。在維修水箱和調整水位等針對性措施後，預計每年可節省99,718立方米的用水量，相當於減少67.75噸碳排放。

KE Activities - Workshops

Sample workshop materials - Water Efficiency Index (shopping malls, worldwide vs. Company A's sites)



Workshop with Savills Property Management Limited
(The Center)

Date: May 7, 2024 (Tuesday)

Time: 9:30 am – 10:30 am

No. of attendees: 3



Workshop with Savills Property Management Limited
(Lippo Centre)

Date: May 7, 2024 (Tuesday)

Time: 11 am – 12 am

No. of attendees: 3



Workshop with Dorsett Hospitality International Limited

Date: May 28, 2024 (Tuesday)

Time: 2:30 pm – 3:30 pm

No. of attendees: 9



Workshop with Kai Shing Management Services Limited

Date: May 31, 2024 (Friday)

Time: 4:15 pm – 6:00 pm

No. of attendees: 15



KE Activities – Site visits

International Advisory Panel (IAP) site inspection

Date: May 22, 2024 (Wednesday)

Time: 4:30 pm – 5:30 pm

No. of attendees: 3



Meter installation and uninstallation
with Water Supplies Department (WSD)
on selective sites

Date:

Installation - March 28, 2024 (Thursday)

Installation – April 10, 2024 (Wednesday)

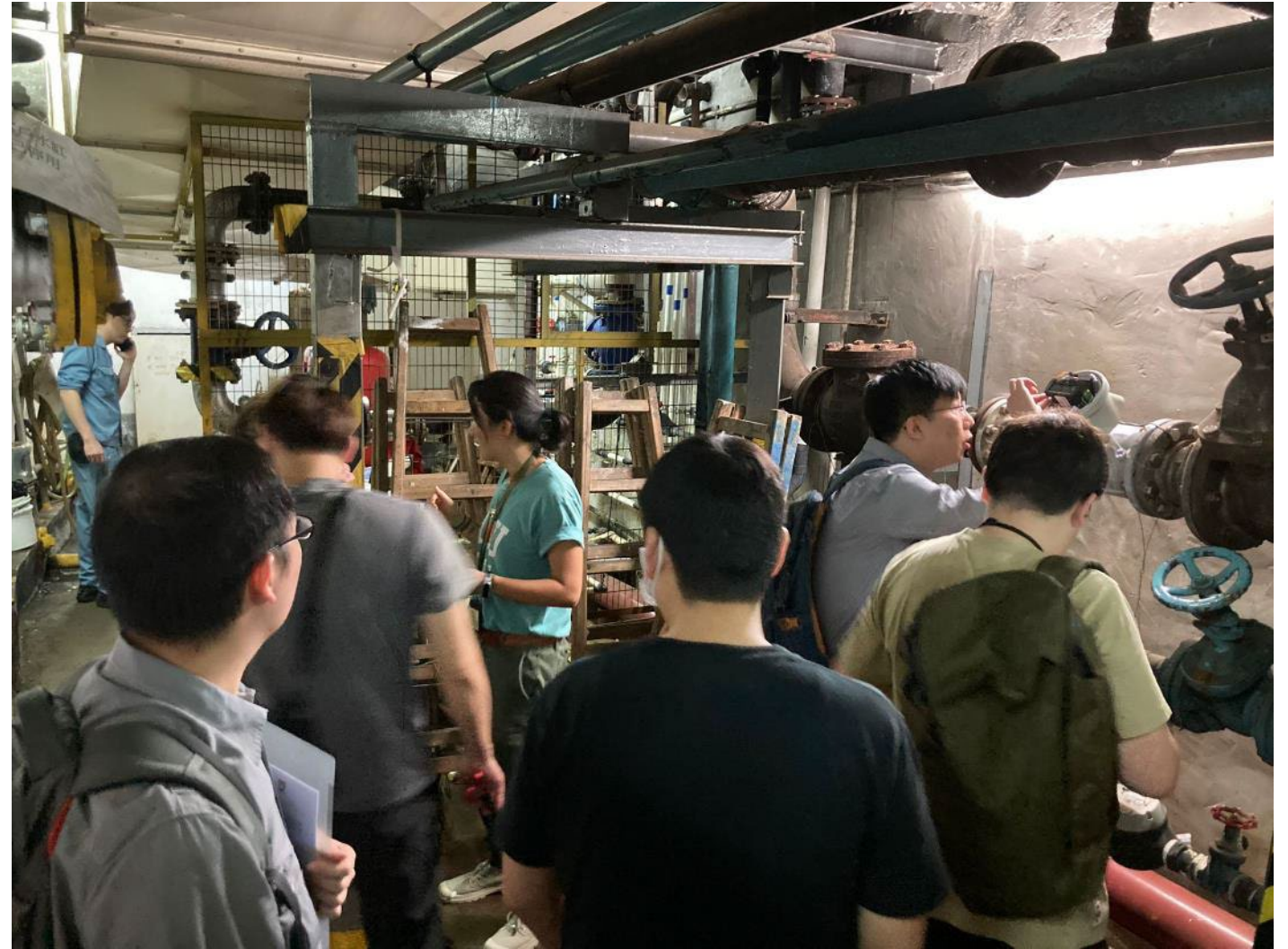
Uninstallation - April 23, 2024 (Tuesday)

Uninstallation – April 29, 2024 (Monday)

Installation – May 31, 2024 (Friday)

Uninstallation – June 25, 2024 (Tuesday)

No. of attendees: 18



An article on the KE outcomes and impact in layman terms (in both English and Chinese) for distribution to the media (max 250 words)

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