



Implementation of Energy Efficient Water-cooled Air-conditioning Systems in Hong Kong

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Electrical and Mechanical Services Department

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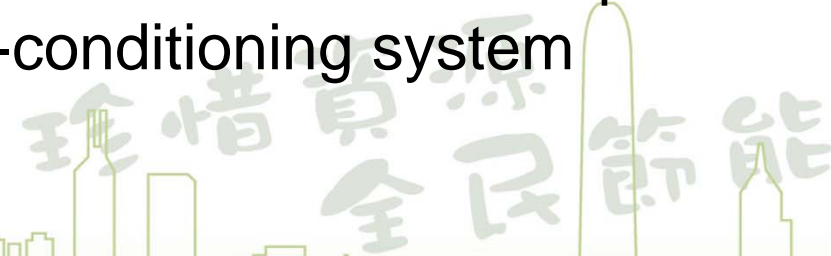
- Introduction
- Implementation of Water-cooled Air-conditioning Systems in Hong Kong
- Fresh Water Cooling Towers Scheme
- District Cooling System in Kai Tak Development
- Concluding Remarks

珍惜資源
全民節能

Introduction

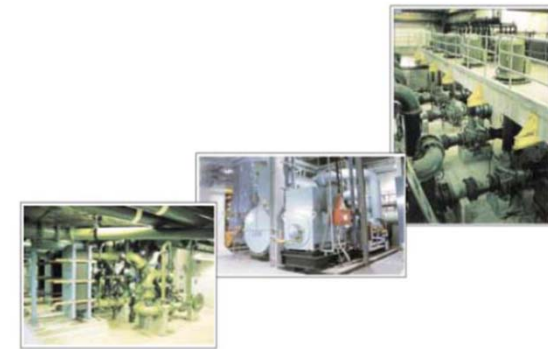


- Air conditioning in buildings accounts for about 30% of the total electricity consumption in Hong Kong
- Wider use of energy-efficient water-cooled air-conditioning system (WACS) in non-domestic buildings is an effective measure to conserve energy
- WACS can save energy up to 20% to 35% as compared to conventional air-cooled air-conditioning system (AACS)



Implementation of WACS

- In 1999, a consultancy study commissioned by EMSD has established that WACS has greater environmental, economic and financial benefits than AACS
- In 2000, a territory-wide implementation study for WACS was commissioned by EMSD



Agreement No. CE 26/2000



Territory-Wide Implementation Study
for Water-cooled Air Conditioning Systems in Hong Kong



Executive Summary

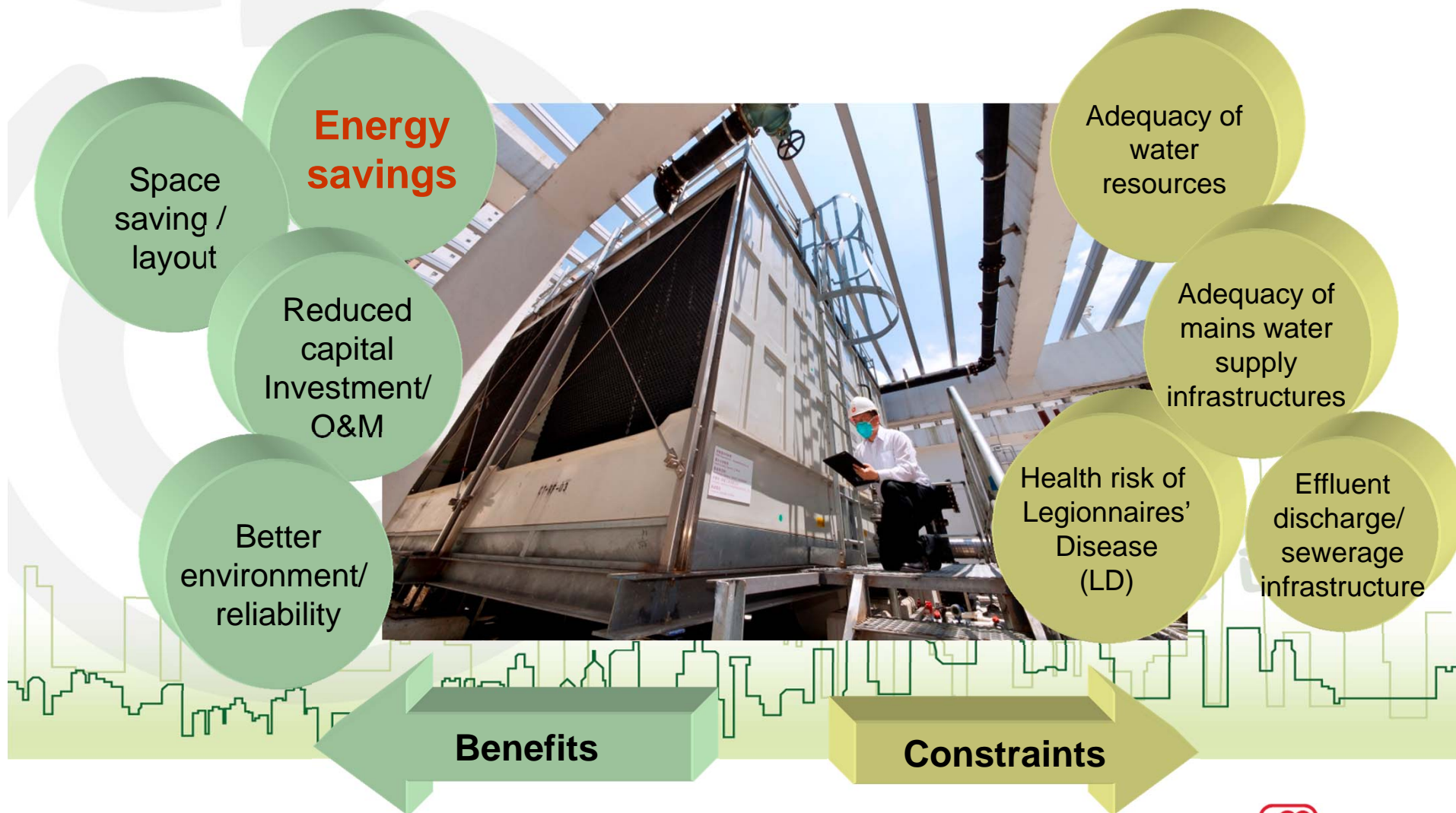


Types of WACS

- Three types of WACS were identified as attractive and having potential for wider adoption and implementation in Hong Kong
 - *Cooling Tower Scheme*  *recommended*
 - *District Cooling Scheme*  *recommended*
 - *Central Seawater Scheme*

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Benefits and Constraints of WACS





FRESH WATER COOLING TOWERS SCHEME

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FWCT Scheme



機電工程署
EMSD Electrical and Mechanical Services Department
The Government of the Hong Kong Special Administrative Region

GovHK 香港政府一站通 繁體版 简体版 MY COLOUR AAA SEARCH Enter keyword(s) SITE MAP

Home > Promoting Energy Efficiency and Conservation > Fresh Water Cooling Towers Scheme

Fresh Water Cooling Towers Scheme for Air Conditioning Systems (FWCT Scheme)

Development

In June 2000, the Government, with the support of EMSD and other bureaux/departments, launched a scheme for wider use of fresh water in cooling towers for energy efficient air conditioning systems (FWCT Scheme) for non-domestic buildings. The FWCT Scheme was launched as a pilot scheme for application in initial 6 designated areas in Hong Kong. With its acceptance by the trade, it has changed its pilot status to a standing one from June 2008. A recent review was completed in September 2010 to streamline application procedures and requirements of the FWCT Scheme.

Who May Apply

Owners of non-domestic premises are encouraged to use water-cooled type (such as fresh water cooling towers) instead of air-cooled type for their air-conditioning system for energy efficiency. They are encouraged to apply for participation in the FWCT Scheme for their fresh water cooling towers installations.

Designated Areas

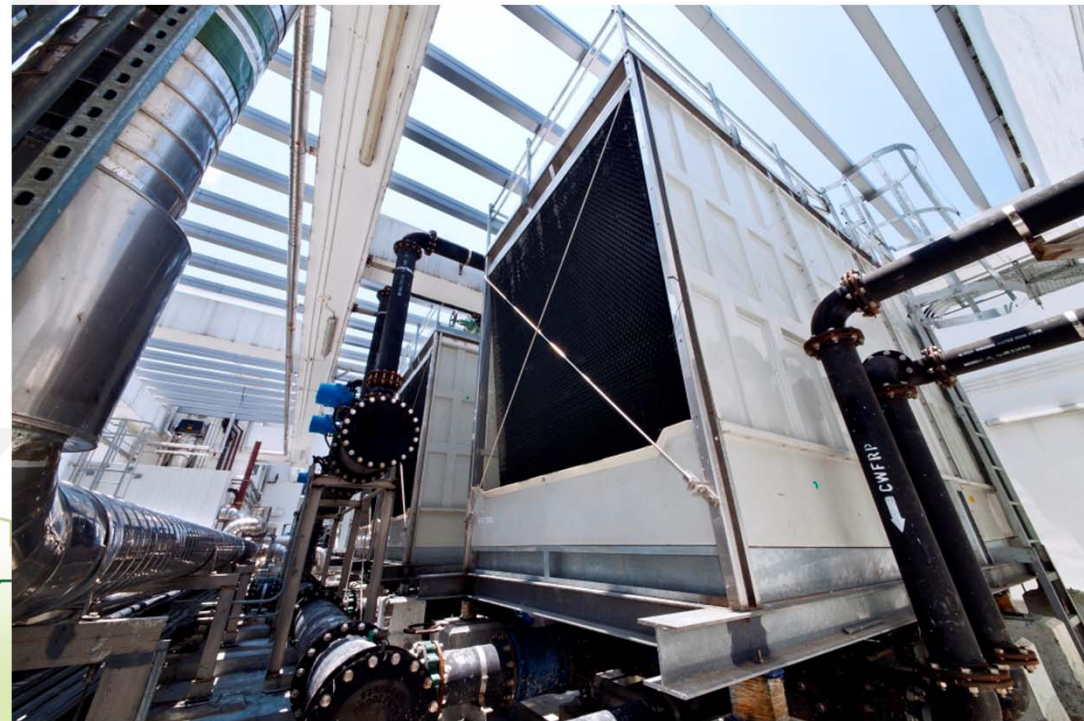
The updated location plans of the designated areas for application are listed at the following:

- Designated areas

For premises located outside the listed designated areas, applications for joining the FWCT Scheme for their fresh water cooling tower installations are also welcomed and will be considered on a case-by-case basis in consultation with WSD on adequacy of fresh water supply. Addition /extension of designated areas will be considered as appropriate with regard to the applications.

[Scheme Brochure on Requirements](#)

2014-15 Budget





Scheme for Wider Use of FWCT

- In June 2000, the Government launched a ***Scheme for wider use of fresh water*** in evaporative cooling towers for energy-efficient air-conditioning systems for non-domestic buildings
- The FWCT Scheme was launched as a pilot scheme for application initially in 6 designated areas in Hong Kong
- The pilot status was changed to a standing one from June 2008

Fresh Water Cooling Towers Scheme for Air Conditioning Systems

November 2010



Energy Efficiency  EMSD

Energy Efficiency  EMSD

Basic Requirements for joining the Scheme



Only for non-domestic buildings

Within Designated Areas?

5 basic design/installation requirements



1

Safe separation 7.5m



2

Effective drift eliminator (<0.005%)



3

Minimization of dead legs

Basic Requirements for joining the Scheme (cont'd)



4

Effective water treatment programme



5

Adequate and safe access



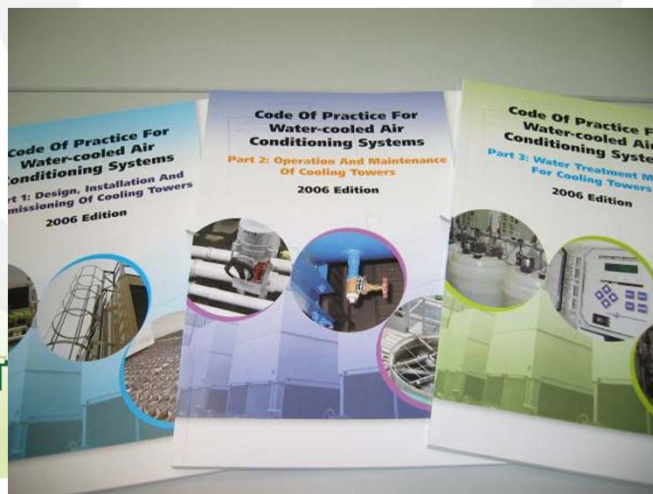
Reuse of bleed-off water for flushing purpose





Code of Practice (CoP)

- CoP for WACS (2006)
 - *Design, Installation and Commissioning*
 - *Proper O&M Practice*
- CoP for Prevention of Legionnaires' Disease (2012)



Designated Areas

- Applications from applicants outside designated areas will be considered on case-by-case basis

機電工程署 EMSD 香港特別行政區政府 機電工程署

香港

GOV.HK 香港政府一站通 簡體版 ENGLISH 搜尋 網頁指南

主頁 最新消息 關於我們 保障公眾安全 我們的工程服務 提倡能源效益及節約 支援政府行動 顧問 / 承辦商 / 供應商角 招標公告 過交電子資訊 公開資料 公用表格 相關網址 聯絡我們

2011-12 財政預算案

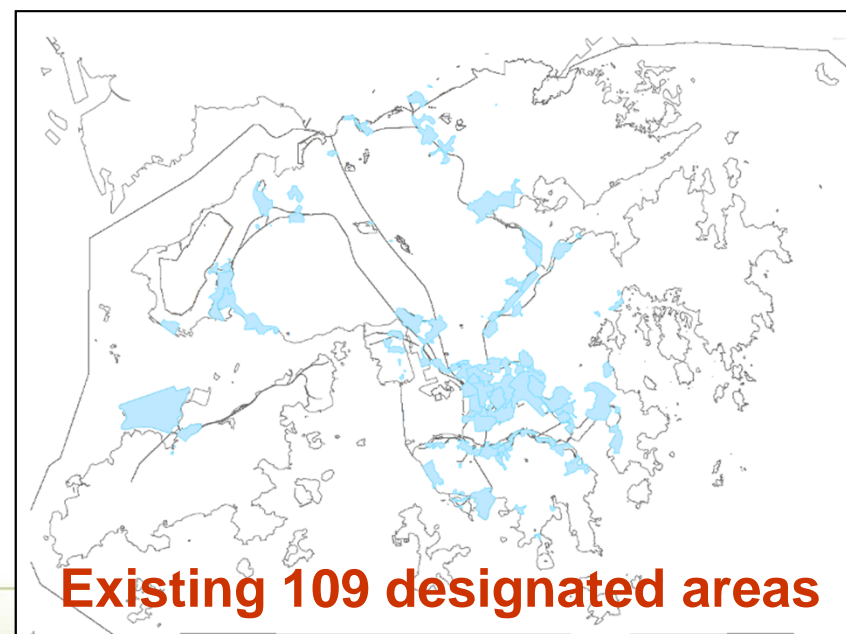
24小時緊急維修熱線 Tel: 2528 5588

空調系統使用淡水冷卻塔計劃 (淡水冷卻塔計劃)：刊物

一般刊物

- 空調系統使用淡水冷卻塔計劃 [PDF 格式 (332KB)] (2010年11月16日起生效的申請指引) ^{195K}
- 廣泛使用淡水於空調系統的蒸發式冷卻塔計劃 [PDF 格式 (711KB)] (2010年11月16日前的申請指引，並有之後六個月寬限期)
- 水冷式空調系統實務守則
 - 第一部：冷卻塔設計、安裝及除工投用 [PDF 格式 (717KB)]
 - 第二部：冷卻塔操作及維修 [PDF 格式 (372KB)]
 - 第三部：冷卻塔水處理方法 [PDF 格式 (402KB)]
- 預防退伍軍人病症工作守則 (由預防退伍軍人病症委員會印制)
- 計劃的指定地區位置圖

區域/地區	香港及離島	九龍	新界東	新界西
1	堅尼地城	紅磡	將軍澳 (1)	葵涌
2	中環	馬頭圍	將軍澳 (2)	青衣 (1)
3	灣仔	何文田	將軍澳 (3)	青衣 (2)
4	銅鑼灣 (1)	啓德	西貢 (1)	青衣 (3)
5	銅鑼灣 (2)	新蒲崗	西貢 (2)	青衣 (4)



(http://www.emsd.gov.hk/emsd/eng/pee/psfwct_pub.shtml)

Water Conservation in FWCT



Grey water recycling

Rainwater harvesting

Recycled rainwater/
greywater as makeup

Recycled bleed-off
water as makeup

Reverse
Osmosis (RO)

Control of
bleed-off water



Achievements of FWCT Scheme

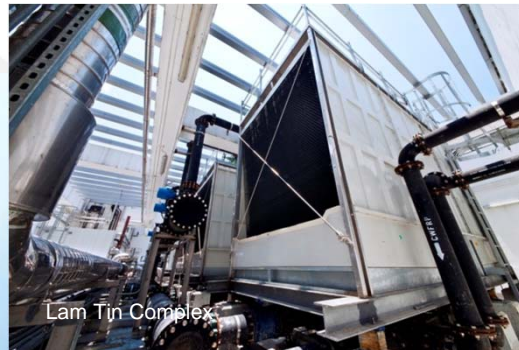
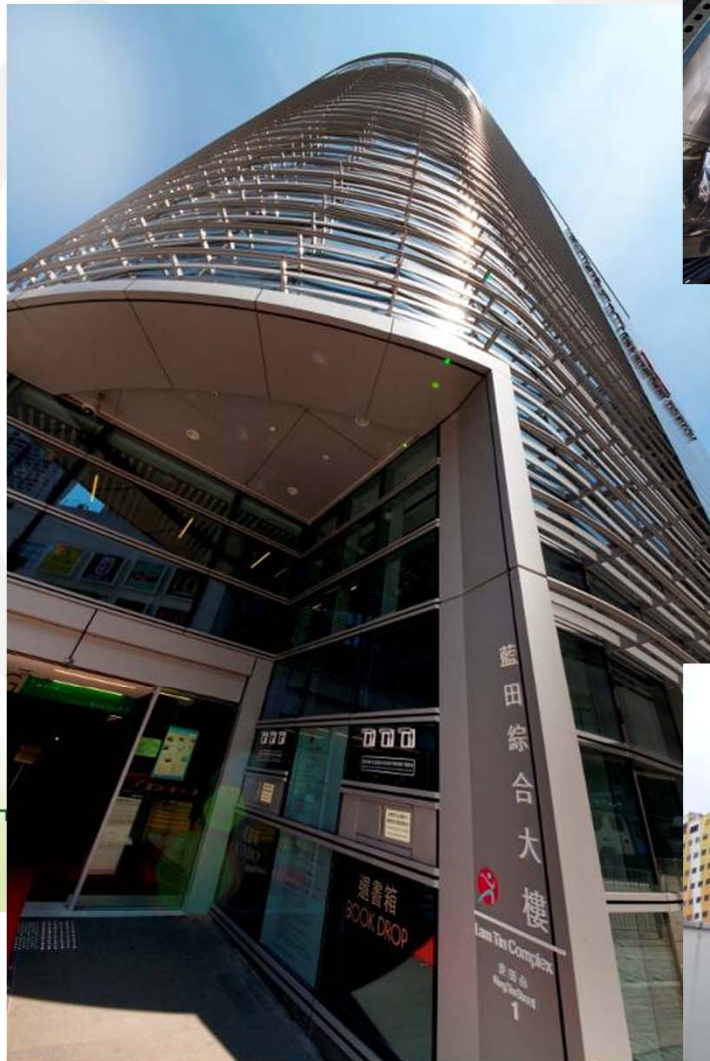


- Up to end March 2014
 - 109 designated areas
 - 827 applications received
 - 517 installations commissioned
 - 321M kWh energy saved per year
 - 224,000 tonnes CO₂ reduced per year



珍惜資源 全民節能

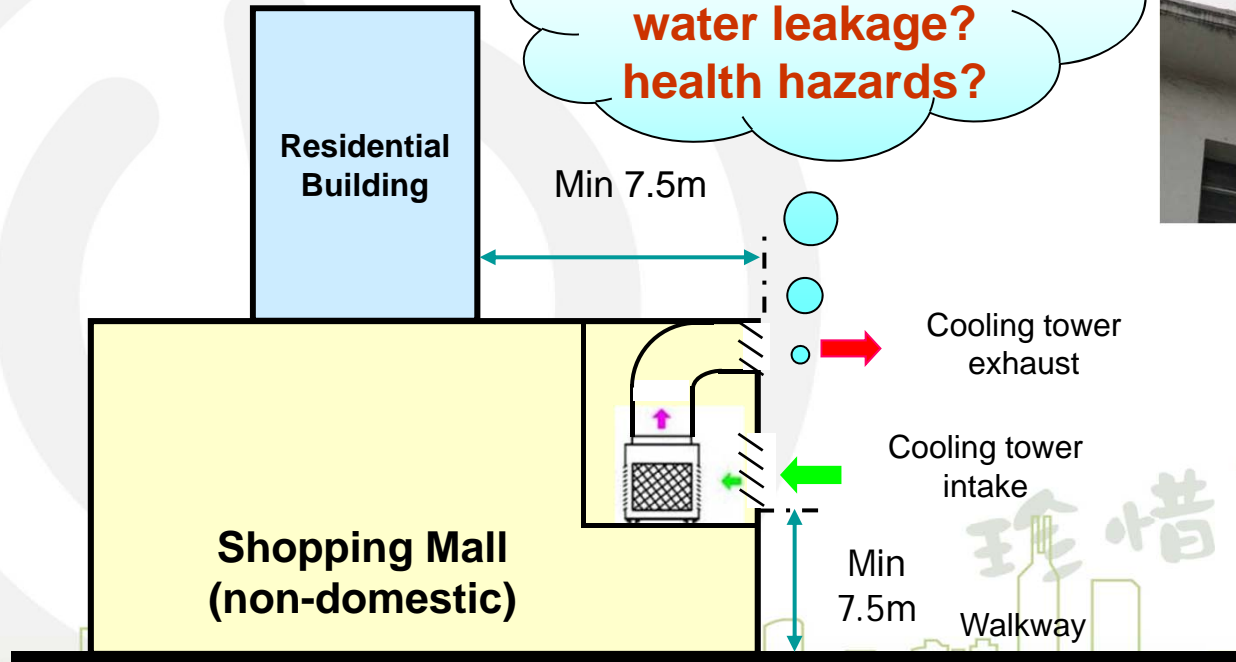
Successful Projects



Concerns on FWCT



Any nuisances?
plume? noise?
water leakage?
health hazards?



Publicity



YouTube <http://www.youtube.com/user/emsdgovhk> 上載



空調系統使用淡水冷卻塔操作及維修的良好作業

EMSDGOVHK 57 部影片
訂閱 123

觀看次數為 58



認識退伍軍人病症
Understanding Legionnaires' Disease

香港預防退伍軍人病症委員會
THE HONG KONG LEGIONNAIRES' DISEASE PREVENTION COMMITTEE, HONG KONG

香港預防退伍軍人病症委員會秘書處
SECRETARIAT, PREVENTION OF LEGIONNAIRES' DISEASE COMMITTEE, HONG KONG
辦事處地址：香港九龍政成街3號
Correspondence Address: 3 Kai Shing Street, Kowloon, Hong Kong
電話 Tel: 2898 3465 傳真 Fax: 2898 4081

Good Operation and Maintenance Practice of Fresh Water Cooling Towers for Air-conditioning Systems

空調系統使用淡水冷卻塔操作及維修的良好作業

機電工程署
EMSD

適用於樓宇管理的
冷水及熱水系統內務管理指引
預防退伍軍人病症的良好做法和措施

香港預防退伍軍人病症委員會秘書處
地址：香港九龍政成街3號
電話：3757 6156 傳真：2890 6081



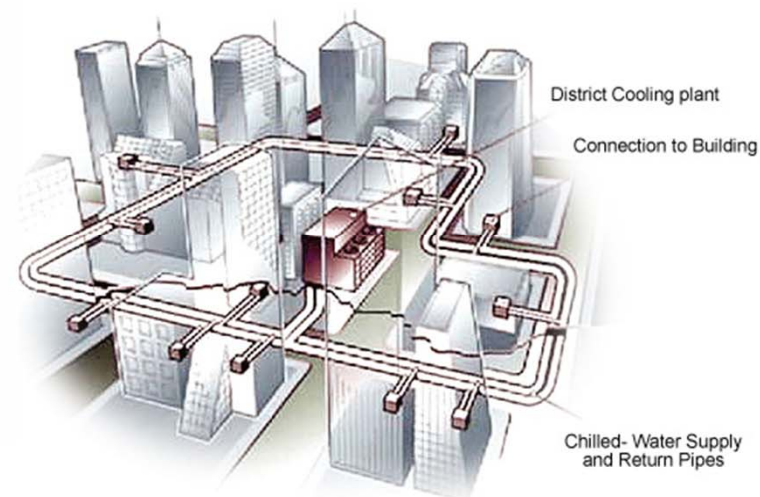
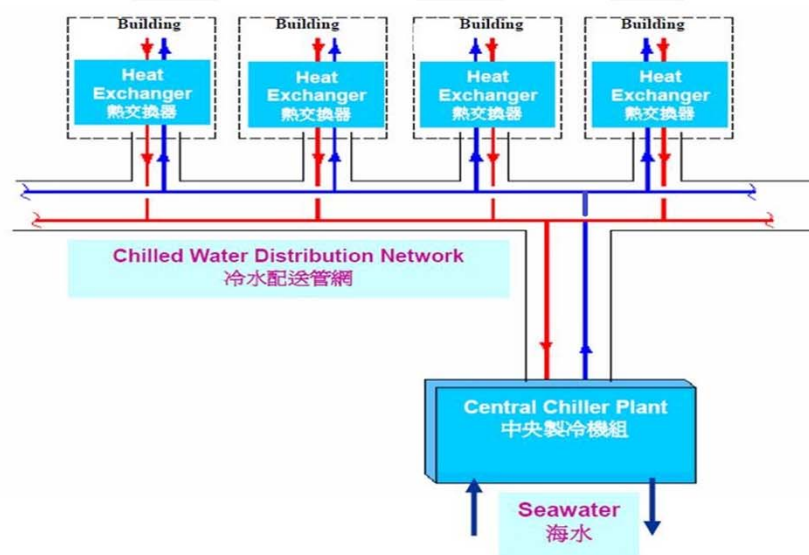
DISTRICT COOLING SYSTEM IN KAI TAK DEVELOPMENT

珍惜資源
全民節能



What is DCS?

- Supply chilled water to more than one building through distribution networks
- Major components include chiller plants, distribution networks and heat exchangers



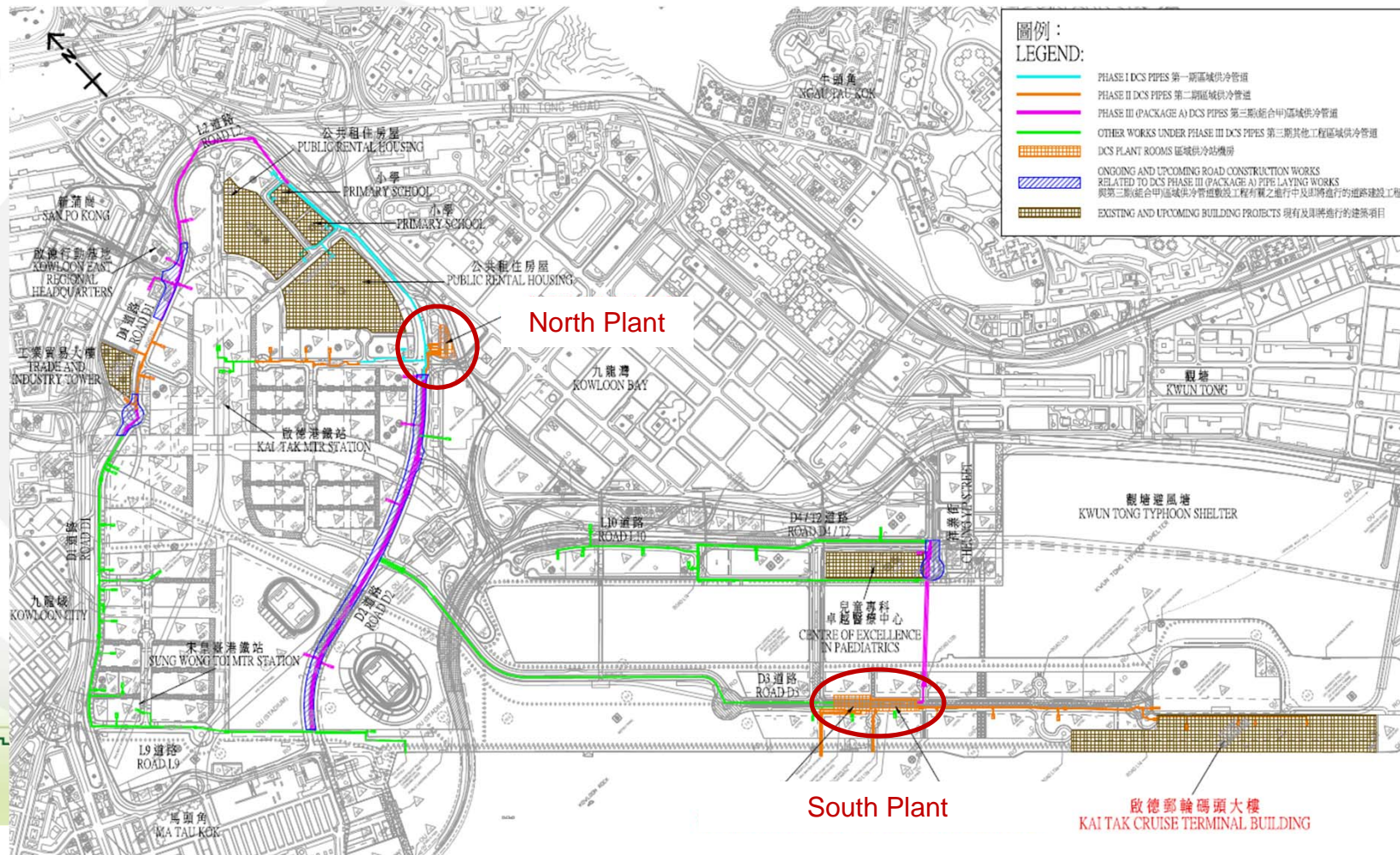


Background of the Project

- Total cooling capacity: 83,250 TR/293 MW
 - North Plant cooling capacity: 48,300 TR/170 MW
 - South Plant cooling capacity: 34,950 TR/123 MW
- Total pipe-run length: around 40 km
- Expected number of users: around 60

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Implementation of the Project





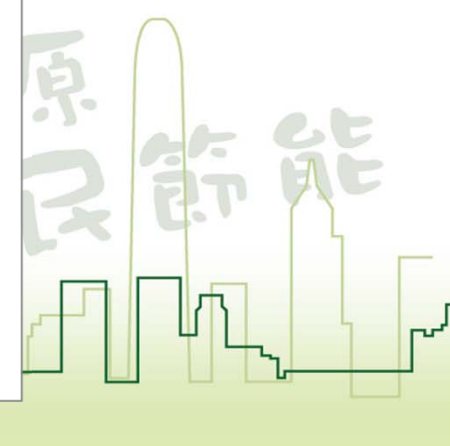
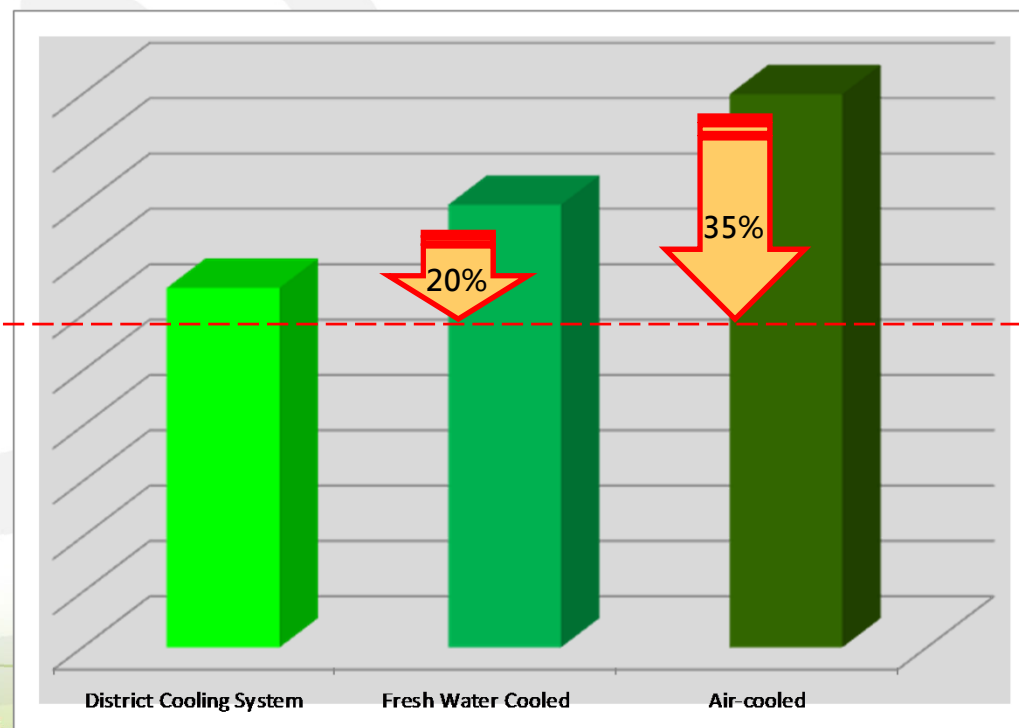
Implementation of the Project

- Phase I – pipes laying works, commenced in Feb 2011, substantially completed in Jan 2013
- Phase II – DBO contract, commenced in Mar 2011, target completion by end 2014
- Phase III (A) – commenced in July 2013, target completion by 2017
- Phase III (remaining) – to suit the actual schedule of KTD (up to around 2021)
- Operation commenced since Jan 2013 (for Kai Tak Cruise Terminal)



Benefits of DCS

- Save energy compared with traditional A/C systems in individual buildings





Benefits of DCS

- Annual energy saving of up to 85 million kWh or reduction of 59,500 tonnes equivalent CO₂ emission upon full development

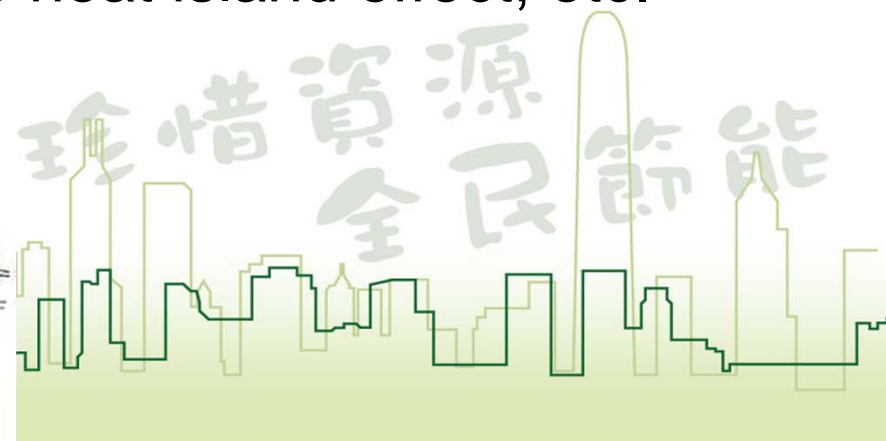
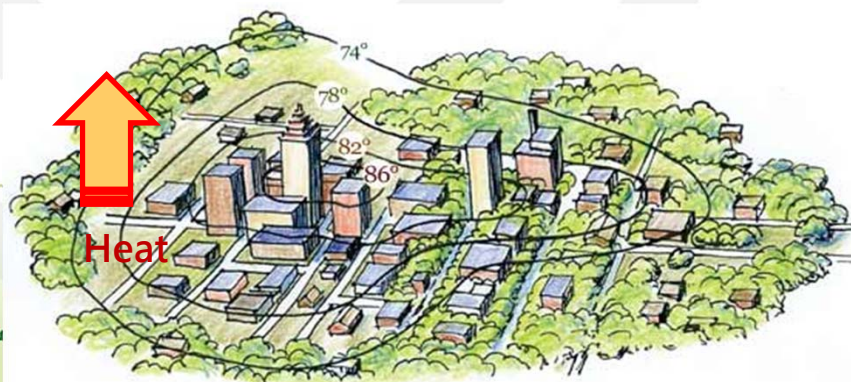
120 Victory Park
2 million trees





Benefits of DCS

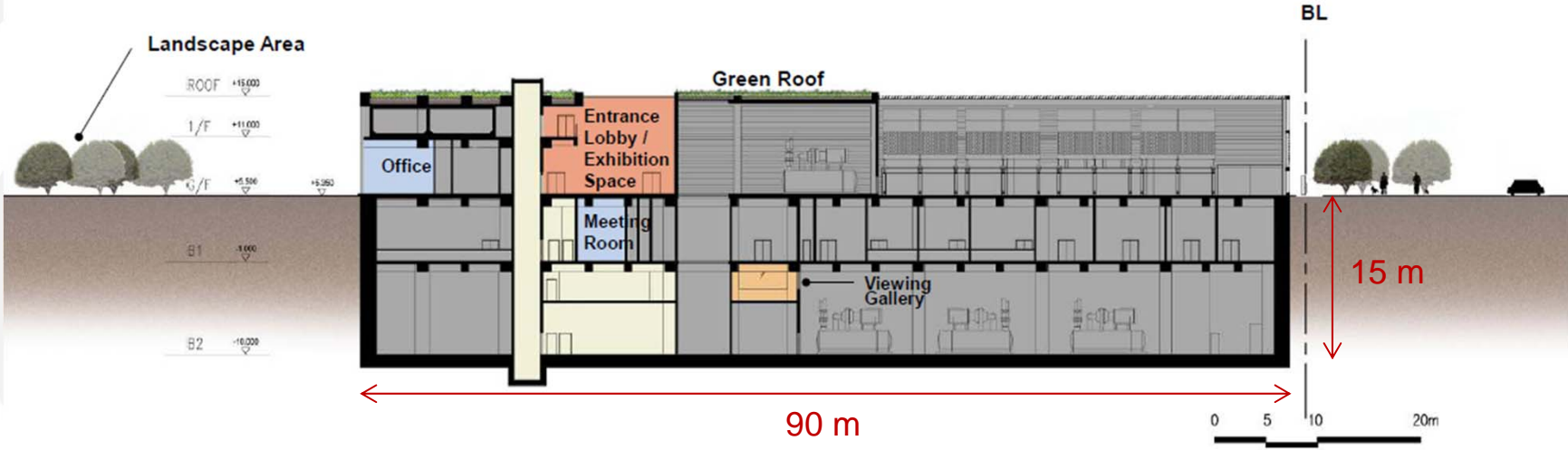
- Noise, vibration and heat arising from individual plant could be reduced
- More adoptable than individual system to varying demand for air-conditioning
- Enhance building/architectural design/function, better planned maintenance, reduce heat island effect, etc.



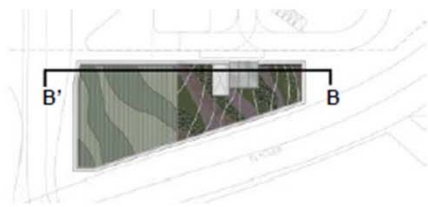
Major Facilities – North Plant



Major Facilities – North Plant



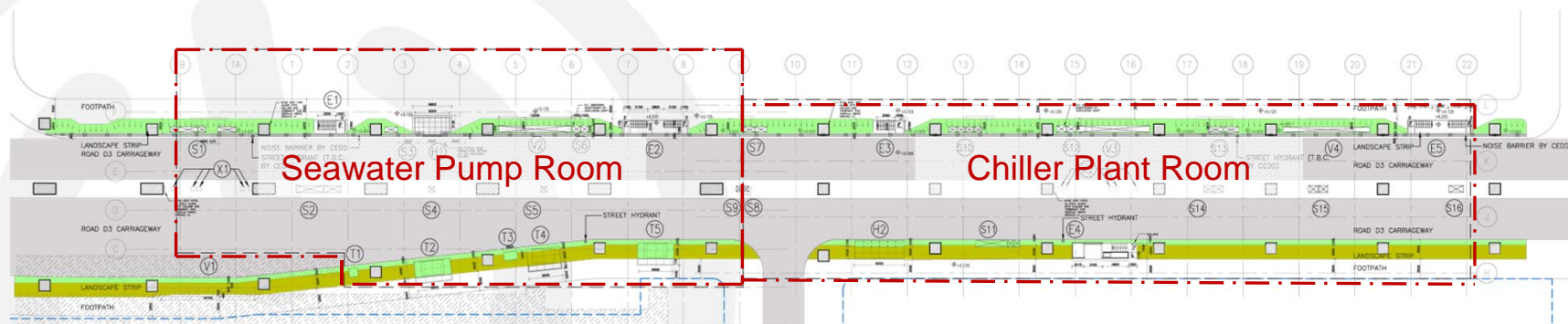
- Plant Room Area
- Internal Circulation





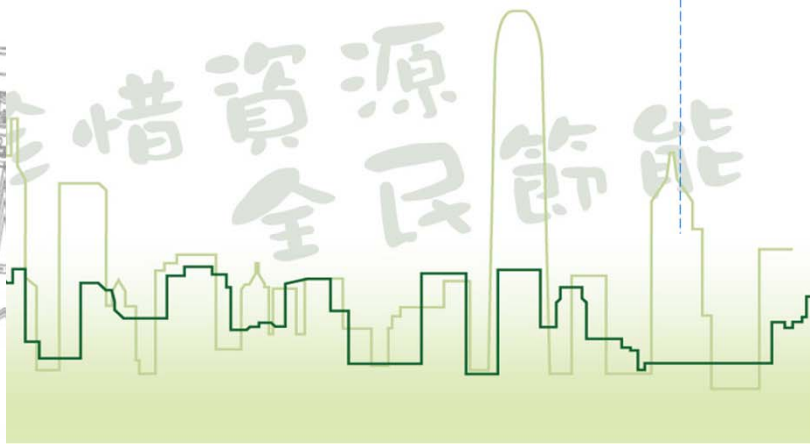
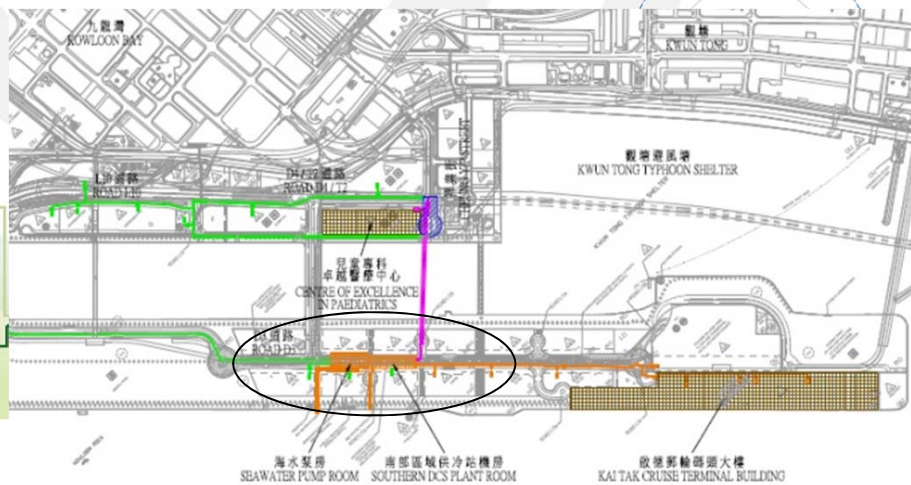
Major Facilities – South Plant

Residential Site



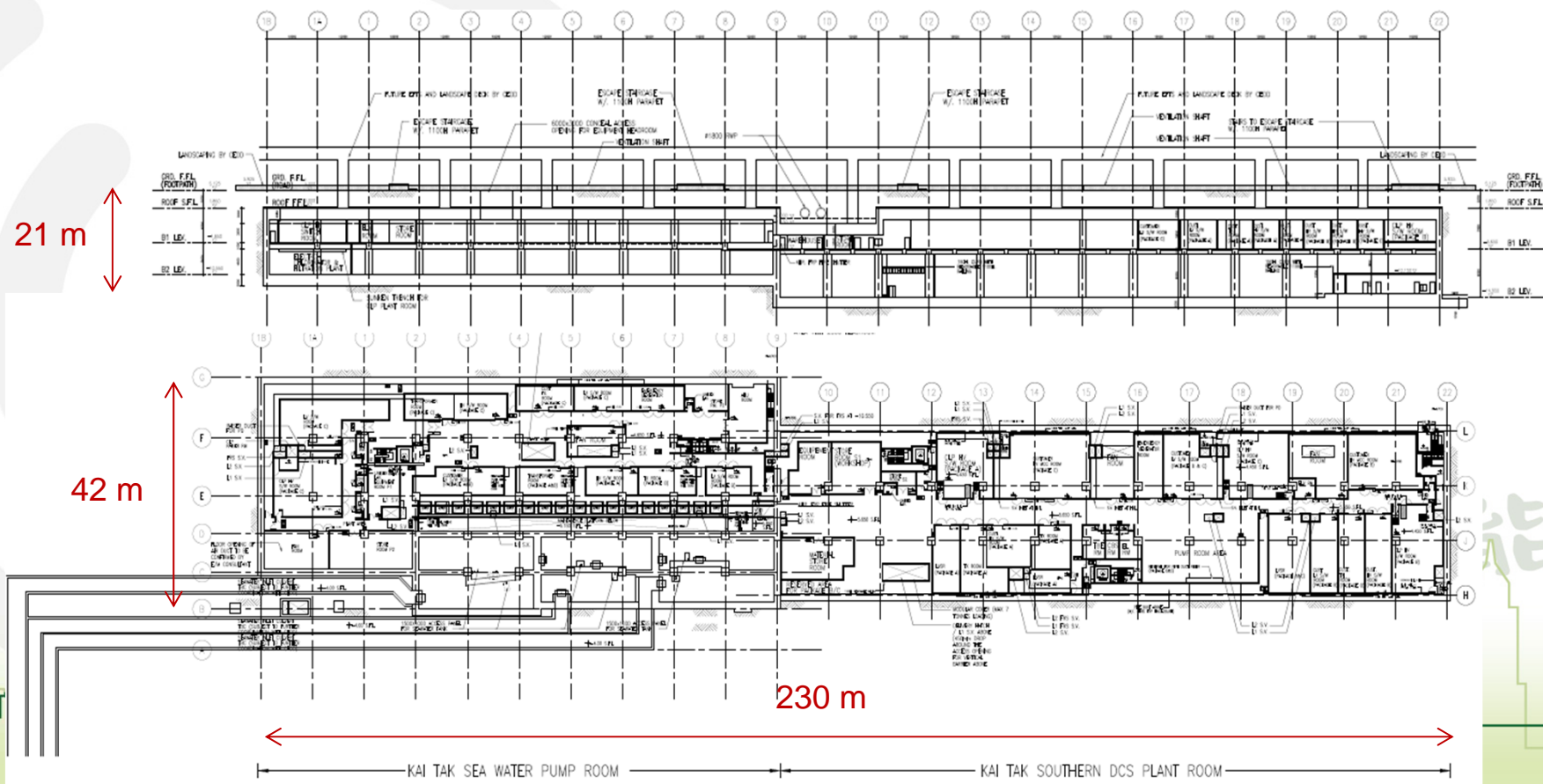
Hotel Site

Hotel Site





Major Facilities – South Plant



Major Facilities – Customer Substation



- Normally, one sub-station per building to house two heat exchangers



Current Status – North Plant



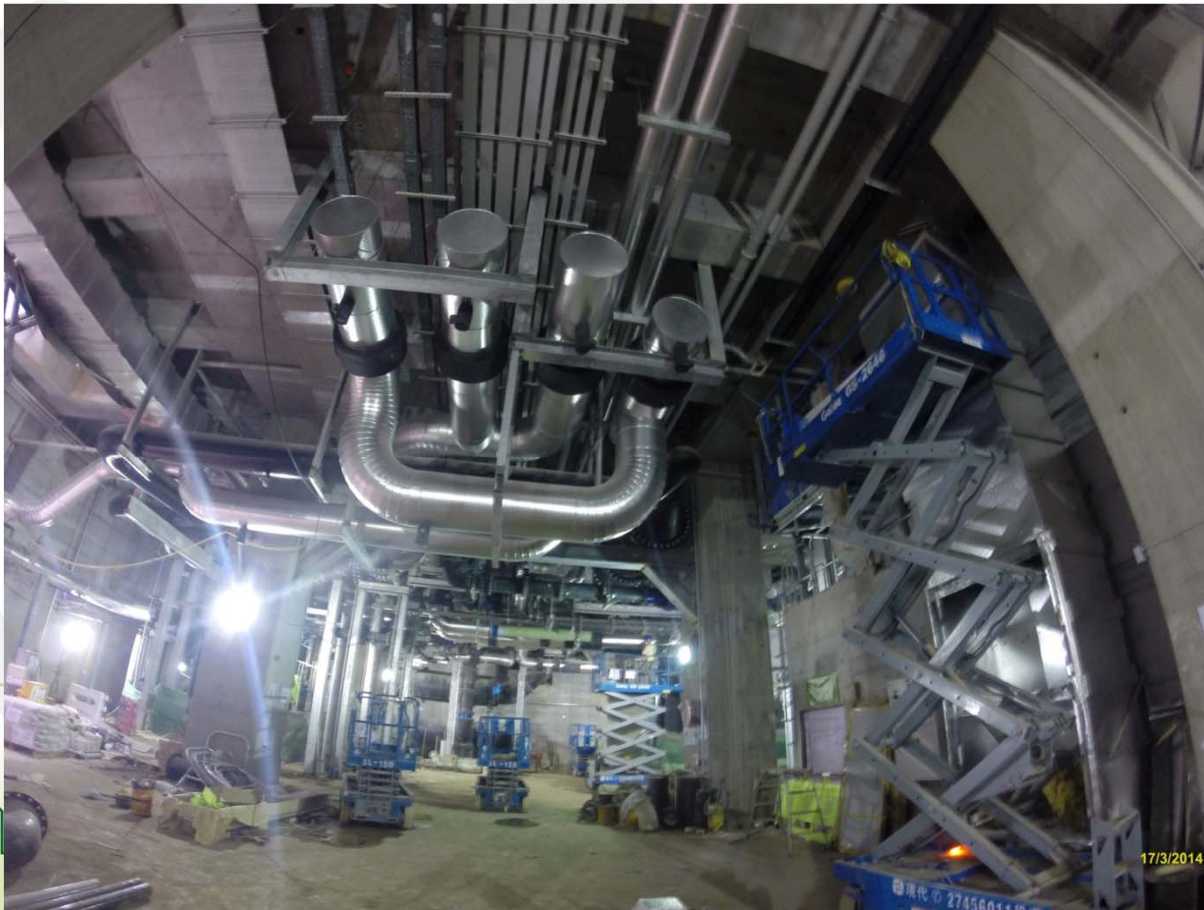
Current Status – North Plant



Current Status – South Plant



Current Status – South Plant





Concluding Remarks

- Water, as a valuable resource in the Earth, plays an important role in air-conditioning installation
- With the adoption of WACS, more than 20% of energy could be saved
- As KTD is a new district development with large demand of air-conditioning, the opportunity was taken to implement the most energy efficient air-conditioning system, i.e. DCS

珍惜資源 全民節能