

THE DISTRICT COOLING SYSTEM (DCS) AT THE KAI TAK DEVELOPMENT

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THE KAI TAK DCS

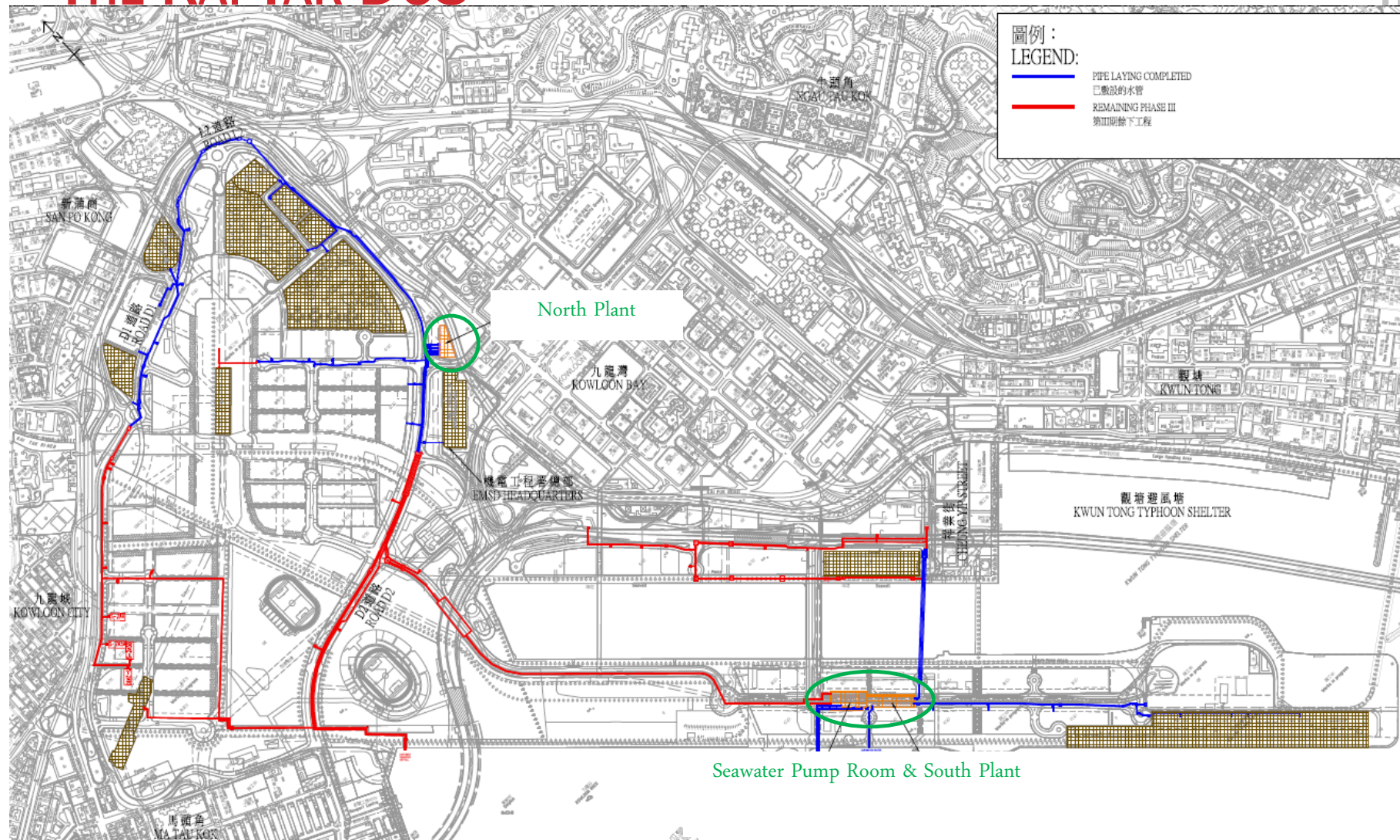


THE KAI TAK DCS

- First-of-its-kind district cooling system (DCS) in Hong Kong
- Total area of over 320 hectares that covers the ex-airport and nearby areas
- Total air-conditioned floor area 1.73 million m²
- Air-conditioning demand of about 284 megawatt of refrigeration (MW_r)



THE KAI TAK DCS



THE DCS PLANTS



**The North Plant located at
Shing Kai Road**



**The South Plant located at
underground of former-
runway of Kai Tak Airport**



BANK OF CHILLERS IN DCS PLANTS



**The installed 1.4MW_r and
4.3MW_r Chillers at the
Basement Floor of North
Plant**



**The installed 17.5MW_r
Chiller at the Basement
Floor of South Plant**



CHILLED WATER PIPING NETWORK



**3-Pipe System of
Underground Chilled Water
Piping in Open Trench**

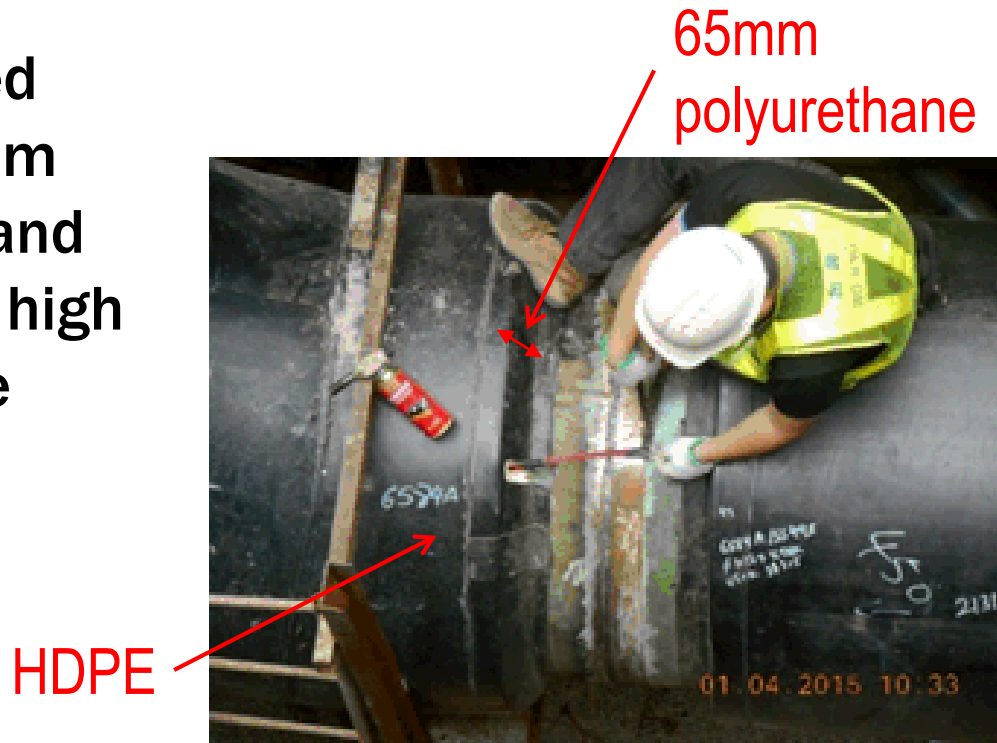


**DCS Pipes Laying inside the
Underground Tunnel**



DCS PIPES PROTECTION

- Factory-prefabricated insulation with 65mm thick polyurethane and external jacket with high density polyethylene (HDPE)



CONSUMER SUBSTATION

At the primary chilled water side of the heat exchanger, i.e. DCS side:

- Supply Temperature = 5°C
- Return Temperature = 13°C



The Heat Exchangers in DCS Substation

At the secondary chilled water side of the heat exchanger, i.e. consumer side:

- Supply Temperature = 6°C
- Return Temperature = 14°C



The Energy Meter in Consumer Building

ENERGY MANAGEMENT AND MONITORING

- Control Rooms of North Plant and South Plant
- Automatic computerised system
- District Cooling Instrumentation, Control and Communication Systems (DCICCS)
 - Optical fibre network for data transmission and the automatic computerised monitoring system for central-control and remote-monitoring



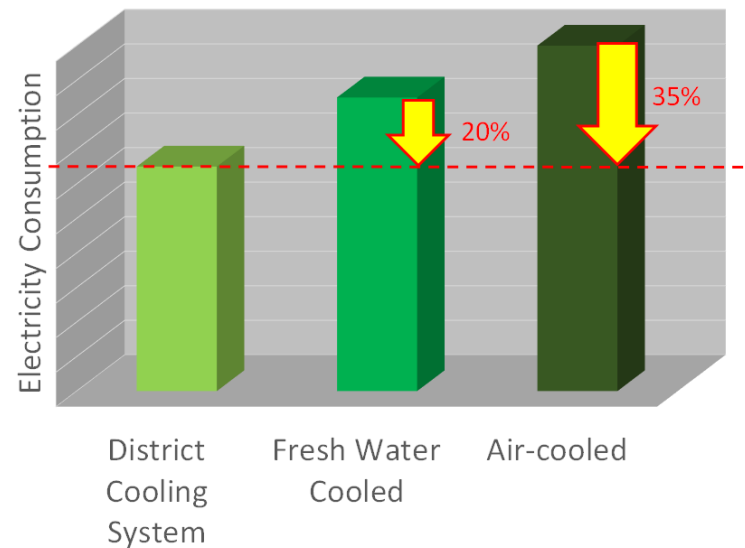
BENEFITS OF THE DCS



BENEFITS OF THE DCS

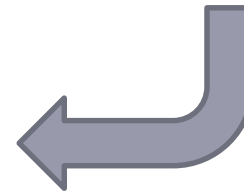
Most energy efficient centralized air-conditioning system

- Normally, DCS use 30%-35% less electricity as compared to traditional air-cooled AC systems
- For KTDCS, using seawater for heat rejection, use 35% less electricity as compared to traditional air-cooled AC systems
- Annual saving of about 85 million kilowatt-hour in electricity consumption



BENEFITS OF THE DCS

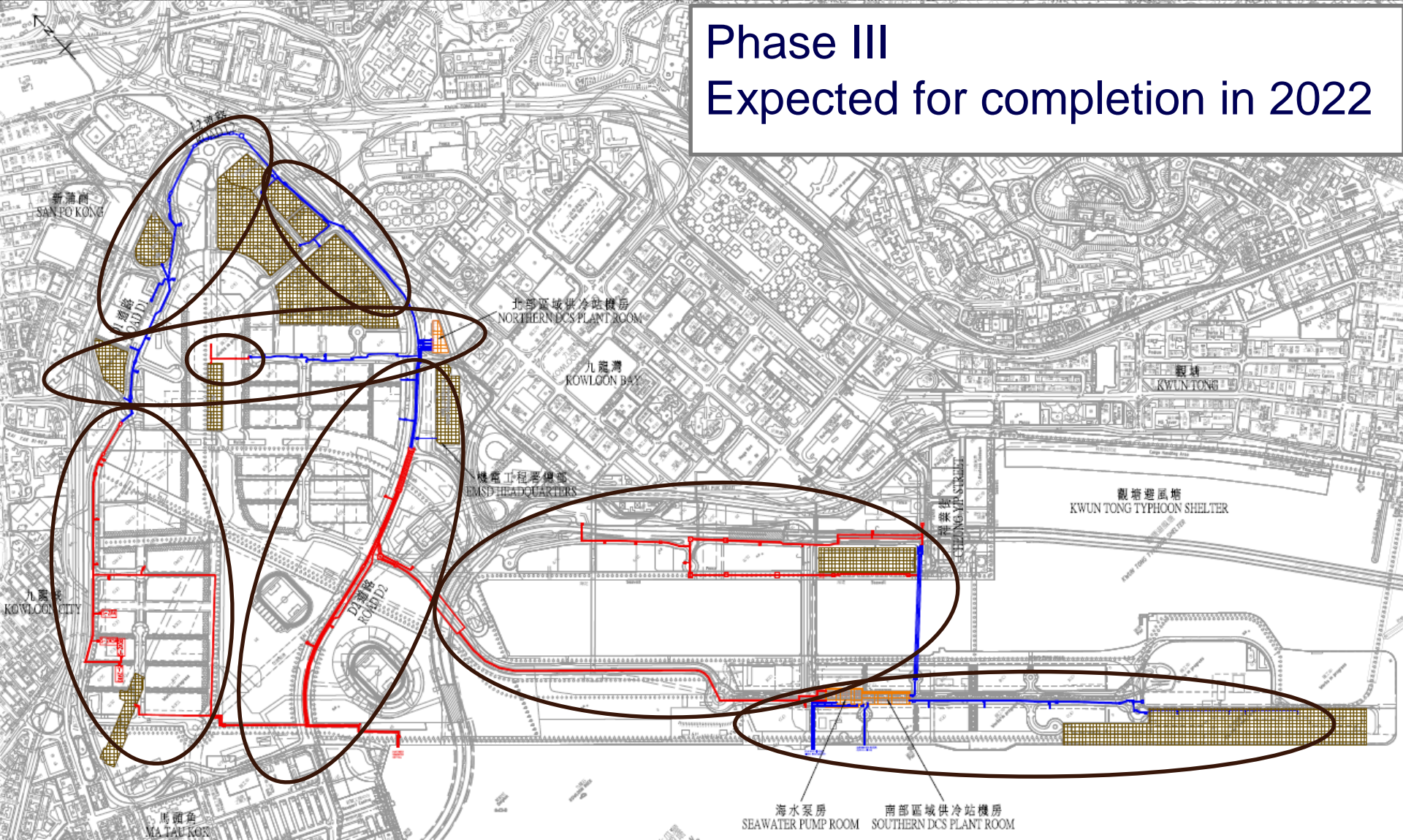
- Reduction in upfront capital cost for chiller plant installation
- More Flexible in Building Design
- Reduce noise, vibration and heat
- More adaptable to varying demand



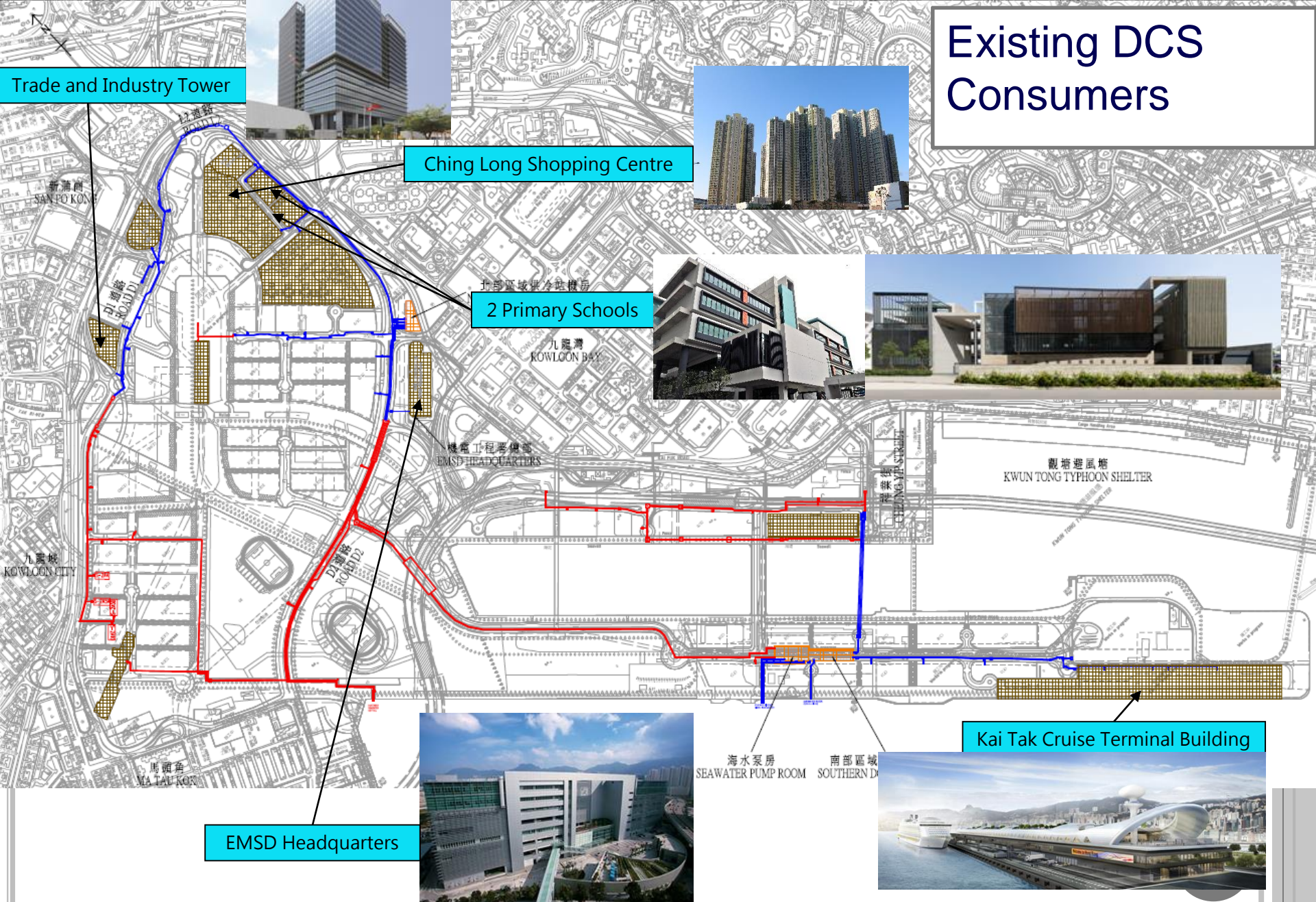
CURRENT STATUS OF DISTRICT COOLING SERVICES



Phase III Expected for completion in 2022



Existing DCS Consumers



2017-2019 DCS Consumers Buildings



DCS SERVICES CHARGES



CHARGING PRINCIPLES

- Comparable to the costs of providing water-cooled air-conditioning systems using cooling towers
- Tariff intends to recover the cost from commercial users over the project life, as taxpayers should not subsidize such air-conditioning charges
- Cost recovery in 30 years
- Price stability
- Simple charging mechanism



DISTRICT COOLING SERVICES ORDINANCE & CHARGING ARRANGEMENT

- “District Cooling Services Ordinance (Cap. 624)” was passed by LegCo and enacted in March 2015
- Charging arrangement intends to recover both the capital and operating costs
 - Capacity charge ➡ Capital costs and O&M costs
 - Consumption charge ➡ Cost that vary with actual consumption



ADJUSTMENT MECHANISM

- Capacity charge rate to be adjusted annually based on the Composite Consumer Price Index (CCPI)
- Consumption charge rate to be adjusted annually taking into account change in electricity tariff rate



CONCLUSION



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- DCS is the most energy efficient centralized air-conditioning system suitable to Kai Tak development.
- The estimated annual saving of 85 million kWh in electricity consumption equivalent to a reduction of 59,500 tonnes of carbon dioxide.
- DCS can improve outdoor environment that no need to accommodate air-conditioning equipment at roof enhancing the flexibility for green-roof design and mitigating the heat-island-effect from KTD.
- The construction of remaining phases of DCS are in progress. Along with the development of KTD, DCS will provide services to around 50 nos. of consumer buildings.



Thank you

