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28 August 2018

Miss Rita Yung
Senior Council Secretary (1)2
Council Business Division 1
Legislative Council Secretariat
Legislative Council Complex
1 Legislative Council Road
Central

Dear Miss Yung,

Legislative Council Panel on Development

PWP Item No. 45CG —
District Cooling System at the Kai Tak Development

At the meeting of the Panel on Development on 26 June 2018, Members requested information and explanation on the tariff for using the District Cooling System ("DCS") at the Kai Tak Development ("KTD") by private developments. Our response is set out below.

Policy intent and cost recovery

The DCS forms part of our multi-pronged strategy in combating climate change. It is a large-scale centralised energy-efficient air-conditioning system which produces chilled water at its central chiller plants and distributes the chilled water to user buildings at KTD through an underground water pipe network.

Compared to traditional air-cooled air-conditioning system and individual water-cooled air-conditioning system ("WACS"), the latter of which is one of the most cost-effective air-conditioning systems available, DCS is 35% and 20% more energy-efficient respectively. A comparison of the unit costs of DCS and those of WACS for public facilities, Government premises and commercial developments at KTD at the price level of 2012/13 is shown in Annex A for Members' information.

The Government's policy intent is to recover both the capital and operating costs from users over the project life, which is estimated to be 30 years, as taxpayers should not subsidise such air-conditioning charges. The DCS charges are set at a competitive level comparable to the costs of using WACS.

District Cooling Services Ordinance

The District Cooling Services Ordinance (Cap 624) (DCSO) came into force in March 2015 stipulating that all public and private non-domestic developments that use district cooling services at KTD are required to pay DCS charges to the Government.

The components and charging formulae of DCS charges are as follows -

(A) Capacity Charge

The Capacity Charge aims to recover the capital cost of the DCS (including the plants, pipes and heat exchangers for individual buildings) and operation and maintenance costs. It is levied according to the contract cooling capacity (i.e. an estimation of the maximum designed cooling capacity for a subscribing building) as agreed between consumers and the Director of Electrical and Mechanical Services before provision of district cooling services commences.

The formula set out in the DCSO is as follows -

Monthly capacity charge = contract cooling capacity (kilowatt refrigeration (kWr)) x capacity charge rate ($/kWr)

(B) Consumption Charge

The Consumption Charge aims to recover costs that vary with the actual consumption of DCS by users. The major part of the charge is the cost of electricity used to provide district cooling services.

The formula set out in the DCSO is as follows -

Monthly consumption charge = measured cooling energy consumption (kWrh) x consumption charge rate ($/kWrh)

Non-government buildings using district cooling services at KTD are required to pay the prevailing capacity charge rate and consumption charge rate. The Capacity Charge rate is adjusted annually based on the Composite Consumer Price Index while the Consumption Charge rate is adjusted annually to take into account the change to the electricity tariff rate. The Capacity Charge rates and Consumption Charge rates since 2012/13 are shown in Annex B for Members' information.

Yours sincerely,

(Desmond Cheng)
for Secretary for the Environment

c.c. Director of Electrical and Mechanical Services (Attn: Mr Raymond Poon)

Annex A

Comparison of the unit costs of DCS and WACS in KTD (at the price level of 2012/13)

Types of Buildings (weighted average)	Unit Cost of DCS[1]	Unit Cost of WACS[2]
All building types	0.635	0.791
Government premises	0.714	1.053
Facilities of public bodies	0.489	0.621
Commercial developments (e.g. private retail, offices[3] and hotels)	0.632	0.722

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[1] The cost of DCS is equivalent to the capacity charge and consumption charge to be paid by a consumer for the use of the district cooling services. The unit cost of DCS is worked out by dividing the total annual charges paid by the consumer for a building (i.e. the capacity charge and the consumption charge) by the building's annual consumption of the cooling energy (i.e. the cooling energy, in the unit of kilowatt-hour refrigeration (kWrh), actually used for generating chilled water to be supplied to the building) over a year.

[2] The cost of WACS is the life-cycle cost, which is the present value of the current and future expenditures for the procurement, replacement, operation and maintenance of building materials and building services installation throughout the life span of the self-generated WACS for a particular building type in the KTD. The cost items include construction cost of plant rooms and equipment (i.e. chillers, pumps, cooling towers, transformers and low voltage switchboards) and pipework, operation cost (i.e. electricity cost, water cost and sewage cost) and maintenance cost (i.e. annual maintenance cost and maintenance staff cost). The WACS is assumed to have a project life of 20 years.

The unit cost of WACS is worked out by dividing the total discounted cash flow of the costs by the required cooling energy (i.e. the quantity of heat removed per second in the unit of kWrh, actually demanded for generating chilled water to be supplied to the building).

[3] For a typical office building of 60 000 square metres of gross floor area and 7 000 kW of cooling capacity, the monthly air-conditioning charge currently varies from $3 to $5 per square foot at the 2014/15 price level. On the other hand, the same for district cooling is estimated to be about $2 per square foot. However, the amount of air-conditioning charges to be paid by the air-conditioning user needs to take into account the operation and maintenance fee to be set by the building owners or their authorized agents for the remaining parts of the central air-conditioning system for the building concerned.

Annex B

Capacity Charge Rate and Consumption Charge Rate for Developments in KTD

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Capacity Charge Rate ($/kWr)	102.96	107.8	112.11	116.03	118.93	121.67	123.74
Consumption Charge Rate ($/kWrh)	0.17	0.18	0.19	0.1959	0.1941	0.1941	0.1978