

**For discussion on  
5 January 2015**

**Bills Committee on District Cooling Services Bill**

**The Administration's response to follow-up issues arising from  
discussion at previous meeting on 16 December 2014**

**Purpose**

This paper sets out the Administration's response to the major concerns raised by deputations and Members at the meeting of 16 December 2014.

**(a) Provide a written response to the views expressed by the deputations at the meeting.**

2. We note that the deputations (see **Annex A**) are generally supportive of the District Cooling System (DCS) project at the Kai Tak Development (KTD) for its significant environmental benefits in energy saving and reduction in carbon emission.

3. Our response to the major views expressed by the deputations at the meeting and their written submissions is provided below. As for their other views and issues mentioned in the written submissions, our response is provided in the table at **Annex B**.

(i) Whether rebate would be provided when actual performance is not met

4. To ensure a reliable provision of district cooling services to consumers, risk factors had been considered in the engineering design stage of the DCS. The DCS therefore has a high level of reliability with sufficient redundancies in its plants. Upon completion of the DCS project, there will be about 26 chillers which could serve mutually as standby chillers to one another. The overall spare capacity will

therefore be higher when compared with that of traditional standalone water-cooled air-conditioning systems (WACS) installed in individual buildings.

5. Furthermore, the DCS has a ring-type distribution piping network to enable a dual feed of chilled water supply to consumers. If the supply from one side of the distribution pipe works is not available, chilled water can be supplied to consumers from another side. Moreover, the whole chilled water distribution piping network is designed as a three-pipe system. When one of the duty supply or return pipes is damaged or under maintenance, the standby pipe can be in operation to maintain the provision of district cooling services.

6. There are also safeguards to ensure a reliable power supply to the system. Each of the two electricity supply cables to every DCS plant carries only 50% of the required electrical load. As such, failure of any of the cables will not affect the power supply condition. To further enhance the reliability of the power supply for the DCS, 11 kilovolt power supply is fed from two supply sources such that when one of the sources fails, the power supply will be automatically switched over to the other source.

7. The current DCS operator has extensive experience in operating the DCS in Europe and Singapore, and has been involved in the design and construction of the DCS at KTD. The contractor has installed a computerized supervisory control and monitoring system to support the systematic operation and maintenance (O&M) programme for the DCS. As such, the chance for a complete failure of the system is quite remote.

8. Since the commencement of the district cooling services in the first half of 2013, no breakdown has been encountered so far. This is comparable to the DCS in Singapore of which the reliability is, according to the available information in hand, over 99%.

9. Under the intended charging policy for the DCS at KTD, which is similar to that of the Water Supplies Department and the two power companies, rebate will not be provided when actual performance is not met in situations such as the suspension of district cooling services

caused by a pipe burst or complete power supply failure to the district cooling plants. This arrangement is in line with that of other utilities in Hong Kong, which do not provide rebate in case of system failure in similar circumstances.

10. To enhance the performance of the DCS, the Electrical and Mechanical Services Department (EMSD) will establish a customer liaison group with individual consumers in order to collect feedback on the O&M of district cooling services.

(ii) Appeal board panel to be extended with expertise on building services O&M aspects

11. As provided under clause 24 of the District Cooling Services Bill (the Bill), the Secretary for the Environment is to appoint members to an appeal board panel consisting of the following members and categories of members –

- (a) not more than 4 members, each of whom is —
  - (i) a barrister qualified to practise as such under the Legal Practitioners Ordinance (Cap. 159); or
  - (ii) a solicitor qualified to act as such under that Ordinance;
- (b) not more than 4 members, each of whom is a corporate member of the Hong Kong Institution of Engineers (HKIE) in one or more of the electrical, mechanical and building services disciplines;
- (c) not more than 4 members, each of whom is a corporate member of the HKIE in a discipline other than those mentioned in paragraph (b); and
- (d) not more than 4 members, each of whom is not, in the Secretary's opinion, from the engineering profession.

12. In this case, persons who have expertise on building services O&M aspects, and are corporate members of the HKIE, would be considered under category (b) or (c). For those who are not, they would be considered under category (d).

(iii) Accuracy of meters

13. The determination of the cooling energy actually consumed by a consumer involves the measurement of the chilled water flow rate, the supply and return chilled water temperatures. Therefore, each meter for measuring the cooling energy consumption comprises three components, namely “flow meter” (for measuring the chilled water flow rate), “temperature sensors” (for measuring the supply and return chilled water temperatures), and the “calculator” (to convert the flow rate and temperatures as measured to cooling energy).

14. The actual inaccuracy for each of the components above is indeed below 1%. When combining the components, the overall inaccuracy of a meter is in turn within 1%. To further enhance and ensure accuracy of the meters, inspection and maintenance<sup>1</sup> is carried out regularly and proactively by the DCS operator under EMSD’s supervision. Therefore, the possibility that the overall meter inaccuracy exceeds the 3% tolerance should be very slim.

15. On the other hand, the 3% inaccuracy tolerance as specified in clause 12 of the Bill is set to identify whether the fee for testing the meter in question should be borne by the approved consumer who has applied to the Director of Electrical and Mechanical Services (DEMS) to have the meter tested under clause 12(1), or by the Administration. As set out in clause 12(4) and (5), if the result of the test is that the meter is registering correctly, the fee should be borne by the approved consumer. Otherwise, no fee for testing is payable by the approved consumer.

16. We would like to clarify that the 3% inaccuracy tolerance is generally adopted by local utilities, and is a worldwide figure generally adopted for measurement of flow application including that of DCS. For example, in the case of the DCS in Singapore, they have specified that the costs of any testing of any meter requested by the consumer shall be borne by the consumer, unless such testing reveals that the

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<sup>1</sup> The operator carries out a yearly validation on site for a meter with the manufacturer’s pre-calibrated tools. The meters will be taken down and sent to the factory for calibration every five to six years. After 15 years of operation, the meter will be replaced with a new one to ensure accuracy.

meter's inaccuracy is found beyond the permitted tolerance of 3%.

17. Moreover, the purpose of setting the inaccuracy tolerance at 3% but not a smaller figure is to prevent abuse and deter consumers from purposefully requesting unnecessary meter tests. This is because a meter test (i.e. calibration) can be costly, and the procedures required for dismantling the meter in question and delivering it to the test lab can be complicated and hence inevitably affect the air-conditioning supply to the building concerned.

(iv) Establishment of a real-time energy saving monitoring system at KTD to monitor the effectiveness of DCS

18. A fully automated and computerized control and monitoring system, and a dedicated 24-hour manned control room will be provided to monitor the real-time performance of the DCS to ensure that it will be operated in its most energy efficient manner.

(v) Use of residual heat from chiller plants of the DCS

19. A substantial and constant residual heat energy demand is needed to justify the use of waste heat from chiller plants of the DCS, as it incurs a significant amount of additional investment in infrastructural facilities such as heat recovery chillers, hot water pumping system and thermally insulated hot water distribution pipes.

20. Without a substantial heat energy demand, it would not be financially beneficial to reuse such low grade (temperature) residual heat. Currently, we do not foresee that there will be a sufficient demand for residual heat in the region.

21. Having said that, provision of space and builders' works for future installation of heat recovery chillers and distribution pipe works for hot water supply has been allowed in the basic infrastructure of the works for Phase II of the project. We will keep in view the developments at KTD, and observe if there will be a sufficient demand for use of residual heat from chiller plants of the DCS for hot water supply to buildings, and consider incorporating heat recovery chiller

installations in the remaining works for Phase III if necessary.

- (b) Provide a written response to the submission of the Real Estate Developers Association of Hong Kong (LC Paper No. CB(1)343/14-15(01)) proposing to establish a back-up system to provide uninterrupted supply of essential services such as electricity and air-conditioning in the KTD and grant gross floor area (GFA) concessions to such system.**

22. A standby air-conditioning system may be needed for buildings regardless of the type of air-conditioning system adopted. Regarding the enquiry as to whether the floor space for accommodating a standby air-conditioning system can be disregarded from the calculation of GFA, the authorized person<sup>2</sup> for the buildings which will subscribe to the district cooling services may submit an application to the Building Authority for exemption of such floor space from GFA calculation at the building plan submission stage under the Buildings Ordinance.

23. The application should contain details and justifications on the need for such standby system, the back-up capacity of, and floor space required for accommodating such system. The application would be considered on a case-by-case basis by the Building Authority in consultation with DEMS and concerned departments. The proposal, however, must first comply with the pre-requisites for the granting of GFA concessions as detailed in the relevant practice notes, the relevant provisions of the Buildings Ordinance and its subsidiary regulations.

- (c) Provide a written response to the submission of the HKIE (LC Paper No. CB(1)357/14-15(02)), in particular to the suggestions mentioned in paragraphs 5 and 6 of the submission.**

24. HKIE has commented that while the Bill provides for the “capacity overrun charge” with reference to the contract and actual cooling capacity, the Bill could also provide incentives for consumers whose actual cooling capacity is below the contract cooling capacity.

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<sup>2</sup> Under the Buildings Ordinance, a developer has to appoint an authorized person registered under the Buildings Ordinance to co-ordinate the building works for a private development.

25. On this issue, we would like to clarify that under clause 5 of the Bill, the approved consumer for a building may revise the contract cooling capacity of the building if DEMS agrees to the revision. If a consumer manages to achieve a lower actual cooling capacity through enhanced operational measures, the consumer concerned could apply for a reduction in the contract cooling capacity, which will in turn reduce the capacity charge.

26. On the other hand, provision of incentives may encourage consumers to deliberately overstate their contract cooling capacity, which will likely lead to abuse and hence affect the overall projected demand for the district cooling services at KTD. Additional investment and equipment will be needed for the DCS to cater for the overstated demand, resulting in an unnecessary increase in the capital cost of the project.

27. HKIE has also suggested including an “improvement factor” in the methods of calculating charges for district cooling services as provided in Schedule 2 to the Bill. According to HKIE’s suggestion, the proposed improvement factor might be determined by DEMS in consultation with stakeholders and professional bodies, and should reflect future technological and managerial advancement that may lead to higher efficiency and hence lower cost of producing cooling services. We agree that future reviews of the tariff are necessary to ensure adherence to the charging principles that have been reported to the Legislative Council (LegCo) Panel on Environmental Affairs, i.e. the DCS tariff will be set at a competitive level comparable to the cost of individual WACS using cooling towers, which is one of the most cost-effective air-conditioning systems available in the international market; and to recover both the capital and operating costs of the DCS from building owners or their authorized agents over the project life, which is estimated to be 30 years, as taxpayers should not subsidize such air-conditioning charges. We have therefore undertaken to review the level of district cooling services charges at least once every five years. Any changes in the cost or revenue of the DCS (such as O&M fees of the contractor) brought about by future technological and managerial advancement for the DCS operator will be taken into

account in the reviews.

**(d) Advise how the Administration could prevent possible abuse of the appeal mechanism provided under the Bill.**

28. As set out in the LegCo brief on the Bill, Part 5 (clauses 22 to 30) of the Bill contains provisions relating to appeals against certain decisions or direction. It provides for the composition of the appeal board panel and the proceedings of an appeal board. It empowers an appeal board to confirm, vary or revoke the decision or direction appealed against. The appeal board is also empowered to substitute its own decision or direction for the decision or direction appealed against.

29. According to clause 22(1) of the Bill, a person who is aggrieved by any of the following decisions and direction made in respect of the person may appeal to an appeal board against the decision or direction –

- (a) a decision not to approve a person as the consumer of district cooling services for a building under clause 4(4);
- (b) a decision to refuse to provide district cooling services to a building under clause 6(2);
- (c) a decision to suspend or terminate district cooling services to a building under clause 7(1)(b), (c) or (g);
- (d) a decision not to resume district cooling services to a building under clause 8(2) where the services were suspended under clause 7(1)(b), (c) or (g);
- (e) a decision to refuse an application for the cessation of the approval of a person as the consumer of district cooling services for a building under clause 9;
- (f) a decision to issue or amend an improvement notice under clause 18;
- (g) a direction contained in an improvement notice.

30. As provided in clause 22(2) of the Bill, an appeal made against any of the decisions and direction under clause 22(1) as set out above does not suspend the decision or direction unless DEMS decides otherwise. In this regard, the Administration considers that this can minimize possible abuse of the appeal mechanism.



**(e) Consider setting up a penalty mechanism under the Bill to penalize individual occupiers / tenants of a user building whose behaviour or activities jeopardize the satisfactory operation of DCS at KTD.**

31. As mentioned in the LegCo brief on the Bill, DCS is to provide chilled water for central air-conditioning system on building basis. Hence, the Bill operates on the basis of approving a “consumer” in relation to a building.

32. Clause 4(1) of the Bill provides that an owner or occupier of the building, or a person responsible for the management of the building, may apply to DEMS in a specified form for approval as the consumer of district cooling services for a building. In this regard, the Bill does not deal with the relationship between an approved consumer and individual occupiers / tenants of the building concerned.

33. According to clause 7(1)(g) of the Bill, DEMS may suspend or terminate district cooling services to a building if in DEMS’s opinion, the behaviour of, or an installation of the building by, the approved consumer for the building is jeopardizing or will jeopardize the operation or reliability of the district cooling services. As for individual users within a building, as with the tenants or occupants of any other buildings using central air-conditioning systems, their use of air-conditioning services and other arrangements are to be decided and negotiated between them and the building owner or the management company.

**(f) Advise whether the DCS at KTD will provide services to domestic developments in the district.**

34. As explained in the Administration’s reply to the LegCo Secretariat dated 21 November 2014 (CB(1)272/14-15(02)), and as set out in paragraph 3 of the LegCo Brief on the Bill, DCS is an energy efficient air-conditioning system alternative to the traditional air-cooled air-conditioning systems and individual WACS (both of which are central air-conditioning systems). As domestic developments are

generally not installed with a central air-conditioning system, owners or occupiers or persons responsible for the management of domestic buildings are unlikely to be consumers of the DCS at KTD.

35. In this context, for the DCS at KTD as specified in the current Schedule 1 to the Bill, the design capacity of Phases I-III A of the project which have received funding approval from the Finance Committee of LegCo is based on the scale of non-domestic air-conditioned developments in the district, which is about 1.73 million square metres (“m<sup>2</sup>”) of non-domestic air-conditioned GFA. It does not cover residential buildings.

### **Advice Sought**

36. Members are invited to note the content of this paper.

**Environment Bureau**  
**January 2015**

**Name list of deputations**

<b>Deputations</b>	<b>Written submissions</b>
# 1. Community & Construction Professionals' Development Centre	Nil.
# 2. Building Services Operation and Maintenance Executives Society	CB(1)366/14-15(01)
# 3. Construction Industry Council	CB(1)357/14-15(01)
# 4. The Hong Kong Institute of Architects	Nil.
# 5. The Hong Kong Institute of Facility Management	Nil.
# 6. The Hong Kong Association of Energy Engineers	CB(1)366/14-15(02)
7. The Real Estate Developers Association of Hong Kong	CB(1)343/14-15(01)
8. The Hong Kong Institution of Engineers	CB(1)357/14-15(02)

# : Attended the meeting on 16 December 2014.

**The Administration's response to  
other views of deputations in written submissions**

<b>Other views of deputations</b>	<b>The Administration's response</b>
<b><i>(1) Construction Industry Council</i></b>	
(i) “The proposed tariff rate is primarily set at HK\$2 per square foot. We understand that this level seeks to achieve full cost recovery of the DCS over its project life in 30 years, in other words, it’s not based on commercial calculation nor in any rate, matching with the prevailing air-conditioning tariff rate in the market which is mostly over HK\$3 per square foot in Kowloon area. In brief, we have no objection on the proposed tariff rate but we would further endorse it if it’s under a simple and stable tariff structure.”	The proposed charging mechanism is designed towards achieving the objectives of providing price stability and a simple charging regime with common charge rates for all buildings regardless of their load profiles.
(ii) “A more than competitive air-conditioning tariff rate is no doubt attractive to the prospective tenants but there are certainly a lot more concerns in their minds	As mentioned in the LegCo brief on the Bill, we will require private non-domestic projects in KTD to connect to the DCS with a view to maximising the environmental

<b>Other views of deputations</b>	<b>The Administration's response</b>
<p>when it comes to trying out a so-called premier green and innovative air conditioning system in practice, as the last thing they want to see is to spend extra sum of money to build their own back-up a/c system on their roofs. So, besides dealing with the challenges of the whole construction carefully one by one, EMSD has to put up a lot of effort to address each concern about DCS down to earth in order to finally get each of the prospective tenant's vote of confidence which is re-locating their workplace to KTD... We would therefore urge EMSD to apply a more client-oriented approach when it comes to the stage of inviting tenancy to KTD.”</p>	<p>benefits of the project. This connection requirement will be implemented by prescribing the appropriate provisions in the conditions of land sale to require the lessee to construct and maintain DCS substations for connection to DCS in accordance with the guidelines issued by EMSD.</p> <p>To assist consumers of the district cooling services in complying with the conditions of land sale, EMSD has issued technical guidelines for connection to DCS, providing details on technical requirements and arrangements for connection to the DCS at KTD. The technical guidelines are available on EMSD's official website.</p> <p>Also, as set out in paragraph 10 of the main paper, in order to collect feedback on the O&amp;M of district cooling services, EMSD will establish a customer liaison group with individual consumers with a view to enhancing the performance of the DCS.</p>

<p>(2) <b><u>The Hong Kong Institution of Engineers</u></b></p>	
<p>(i) “In the Bill, the HKIE views that the principle to incorporate ‘rate of change of CCPI’ and ‘rate of change in electricity tariff’ in the determination of future ‘capacity charge rate’ and ‘consumption charge rate’ is a reasonable approach and should be supported. However, it is suggested to have a list of relevant figures for comparison purpose to justify the proposed setting of the ‘capacity charge rate’ at \$112.11 per kW<sub>r</sub> and also the ‘consumption charge rate’ at \$0.19/kW<sub>rh</sub> as stated in Schedule 2 of the Bill.”</p>	<p>Based on our estimate, the DCS tariff of an office building at KTD with a total GFA of about 60 000 m<sup>2</sup> would be about \$20/m<sup>2</sup> (i.e. around \$2 per square feet). The daily operating hours of the office building quoted in this example are ten hours from 8 a.m. to 6 p.m.</p> <p>Apart from the DCS tariff, individual DCS users of a building subscribing to district cooling services have to share the costs of air-conditioning of the building to acquire the chilled water for cooling purpose, averaging at about \$1 per square feet.</p> <p>As compared with the costs of conventional air-conditioning systems ranging from \$3 to \$5 per square feet, the cost of DCS (including both the DCS tariff and the costs of the air-conditioning systems installed in individual user buildings) is relatively lower. Further information and comparison of air-conditioning charges will only be available when private developments are in place at KTD.</p>

(ii)	<p>“Furthermore, it is suggested to consider setting the statutory limit on the accuracy of meter used to measure the actual cooling capacity and actual cooling energy consumption of the building, similar to that of electricity meter and water meter as in other ordinances.”</p>	<p>As specified in clause 12 of the Bill, an approved consumer for a building who doubts the accuracy of a meter that measures the actual cooling capacity and actual cooling energy consumption of the building may apply to DEMS to have the meter tested. If the result of the test is that the meter is registering correctly, the fee should be borne by the approved consumer. Otherwise, no fee for testing is payable by the approved consumer.</p> <p>Regarding the charges for district cooling services, in the event that the meter is found not to be properly recording consumption or demand of district cooling services due to interference, tampering, disconnection, malfunction (other than normal wear and tear) or otherwise of the meter, ancillary facilities or connecting pipes, EMSD will determine the amount of consumption and capacity of district cooling services for the period during which the meter ceased to record properly based on any available technical evidence, records and other relevant circumstances. A new meter will also be provided to the consumer as soon as practicable.</p>
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<b>(3) <u>The Hong Kong Association of Energy Engineers</u></b>	
<p>(i) “The success of the DCS at KTD depends on the return on investment (ROI), diversification of the building usage and the reliability of the DCS. For the ROI, the income comes from the users within the region. To make sure all users within the region will purchase the chilled water from the DCS, we would like to propose as follows:</p> <ol style="list-style-type: none"> <li>1. Charging System <ul style="list-style-type: none"> <li>• A simple charging system for all customers</li> <li>• Must cover the capital and operating costs over the project life</li> <li>• Similar or lower than the conventional individual WACS using cooling towers</li> </ul> </li> <li>2. Charging Proposal <ul style="list-style-type: none"> <li>• Capacity charge</li> <li>• Consumption charge</li> </ul> </li> <li>3. Annual Tariff Adjustment Mechanism <ul style="list-style-type: none"> <li>• Capacity charge based on the Composite</li> </ul> </li> </ol>	<p>We agree with the suggestions. The proposed charging mechanism has incorporated the proposed elements, and is designed towards achieving the objectives of providing price stability and a simple charging regime with common charge rates for all consumers regardless of their load profiles.</p>



	<p>Consumer Price Index</p> <ul style="list-style-type: none"> <li>• Consumption charge based on the change in electricity tariff rate.”</li> </ul>	
(ii)	<p>“For diversification of the building usage at KTD, except the government office buildings, the Government should plan for buildings or development with different nature, e.g. hotel, stadium, etc. so that peak demand of the building load of all buildings will not happen at the same time and will be shifted to different periods.”</p>	<p>The design of the DCS has already taken into account the diversification of the building usage at KTD, which includes differences in the maximum cooling capacity of the buildings, the cooling load required by each building type, and hours of operation of the cooling service.</p> <p>As mentioned in the Administration’s paper to the LegCo Panel on Environmental Affairs in June 2010, the DCS project will deliver the designed cooling capacity in accordance with the development plan of KTD.</p> <p>As the development plan will be implemented in three packages, major DCS equipment will be provided in stages. Advanced equipment models will be procured at the time when additional equipment is needed.</p>
(iii)	<p>“To ensure the reliability of the DCS, we recommend recruiting local O&amp;M specialist to carry out the daily O&amp;M of the DCS. Since complaints from the customers will be received, the authorized inspectors</p>	<p>As mentioned in paragraph 7 of the main paper, the current DCS operator has extensive experience in operating the DCS in Europe and Singapore, and has been involved in the design and construction of the DCS at KTD. O&amp;M of</p>

<p>must be empowered to enter the buildings for checking, inspection and maintenance.”</p>	<p>the DCS will be carried out by O&amp;M specialists.</p> <p>Moreover, in order to collect feedback on the O&amp;M of district cooling services, EMSD is planning to establish a customer liaison group with individual consumers with a view to enhancing the performance of the DCS.</p> <p>As for the suggestion of empowering authorized inspectors to enter the buildings for checking, inspection and maintenance, it is already covered under clause 20 of the Bill which is as follows –</p> <p>(1) An authorized officer may, at all reasonable times, enter a building to do any or all of the following —</p> <ul style="list-style-type: none"> <li>(a) to inspect the building for the purposes of verifying information that is needed in determining a charge payable in respect of the building;</li> <li>(b) to install, inspect, test, operate, maintain, regulate, alter, repair, replace or remove any part of the DCS in the building;</li> <li>(c) to suspend or terminate district cooling services to the building.</li> </ul> <p>(2) Subsection (1) does not empower an authorized officer</p>
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		<p>to enter a part of the building that is for residential use without the consent of the occupier of that part.</p> <p>(3) An authorized officer may exercise any power under this section with the assistance of any other person the officer thinks fit.</p>
<p><b>(4) <u>Building Services Operation and Maintenance Executives Society</u></b></p>		
<p>(i)</p>	<p>“For the capacity charge and the consumption charge set at HK\$112.11/kW/month and HK\$0.19/kWh respectively, we would suggest the Government to benchmark with other commercial facilities in the nearby districts for justifications.”</p>	<p>As mentioned in the LegCo brief on the Bill, the Administration has undertaken to set the district cooling services tariff at a competitive level comparable to the cost of individual WACS using cooling towers, which is one of the most energy-efficient air-conditioning systems available in the international market.</p> <p>We have also made a comparison between the costs (including capital and recurrent costs) of DCS and those of WACS per unit of cooling energy, in order to ensure that the DCS tariff is set at a competitive level comparable to the cost of WACS.</p>