

LCQ16: District Cooling Systems

Following is a question by the Hon Chan Hak-kan and a written reply by the Secretary for the Environment, Mr Wong Kam-sing, in the Legislative Council today (January 13):

Question:

Hong Kong's first district cooling system (DCS) is located in Kai Tak (KTDCS), which has been put into operation since 2013, providing services to the public and private non-domestic developments in the Kai Tak Development Area. Given that there was an overrun in the cost of the construction works of KTDCS by two times (increasing substantially from \$1.67 billion to \$4.95 billion) and it takes decades to recover the cost, some members of the public have questioned the cost effectiveness of adopting such systems locally. In this connection, will the Government inform this Council:

- (1) of the maintenance and other operating expenses of KTDCS in the last financial year;
- (2) of the energy efficiency of KTDCS at present; the reduction in carbon emissions and the savings in electricity cost due to the adoption of the system since its commissioning;
- (3) how the (i) capital and (ii) recurrent expenditures per megawatt of the cooling capacity of KTDCS compares with those of the individual water-cooled air-conditioning systems using cooling towers;
- (4) given that some members of the public have criticised DCSs for their high construction costs, long cost recovery periods and high maintenance costs, whether the Government has reviewed the cost effectiveness of KTDCS; if so, of the details;
- (5) of the estimated expenditures and cost recovery periods of those DCSs which the Government intends to build in new development areas (such as the Lok Ma Chau Loop) (set out such information by district); whether it will take enhancement measures for the new DCSs; if so, of the details; and
- (6) given that a water main in a chiller plant room of KTDCS burst in July 2018, causing flooding in the room, of the number of similar incidents that have occurred since the commissioning of the system; the measures in place to prevent the occurrence of similar incidents?

Reply:

President,

The District Cooling System (DCS) in the Kai Tak Development (Kai Tak DCS) is the first of its kind in Hong Kong. In this regard, the Government

decided to submit funding applications to the Finance Committee (FC) by phases for taking forward the works, having regard to the progress of the Kai Tak Development including the construction and operation programmes of the relevant buildings. The total funding approved for all phases of the Kai Tak DCS was \$4,945.5 million, which was the same as the estimate reported when the funding application for Phase IIIA of the Kai Tak DCS was submitted to the FC in 2013.

The Government's reply to various parts of the Hon Chan's question is as follows:

(1) The Kai Tak DCS is still at its initial stage of operation. Only 11 buildings requiring central air-conditioning in the Kai Tak Development have been completed and are using DCS at the moment. Their cooling demand is only a fraction of the maximum design cooling capacity. Since the Kai Tak DCS is still not in full operation at this stage, operating data for the entire system is not yet available. Besides, we are seeking funding approval by the FC for the DCS projects in the Tung Chung New Town Extension (East) and Kwu Tung North New Development Area, and the relevant tenders will be invited in parallel. As the operating data may affect the tender exercises, it is not appropriate to disclose such information at this stage.

(2) In general, DCS saves a maximum of 35 per cent electricity consumption as compared with conventional central air-conditioning systems separately installed in individual buildings, thus reducing carbon emissions. It is therefore an environmental infrastructure to combat climate change and save energy. The total estimated electricity saving from the commencement of operation of the Kai Tak DCS in 2013 to 2019-20 is about 20.3 million kWh (the total estimated electricity cost saving is about \$24 million), which is equivalent to a reduction in carbon emissions of 14 210 tonnes.

(3) and (4) In general, DCS saves a maximum of 20 per cent electricity consumption in comparison with individual water-cooled air-conditioning systems using cooling towers (WACS). Besides, since it is not necessary to install chiller plants at user buildings, the upfront capital cost can be reduced by about 5 per cent to 10 per cent of the total building costs. Overall speaking, DCS is more cost-effective than WACS. The Government has committed to setting the tariff of DCS at a competitive level, comparable to the cost of using WACS, with a view to recovering the capital and operating costs of DCS through charges collected from its users over the system life of 30 years. We conducted a review on the tariff level of the Kai Tak DCS in 2020, and the findings indicated that the prevailing tariff could be kept unchanged while the target payback period of 30 years could still be achieved.

(5) The Environment Bureau and the Electrical and Mechanical Services Department (EMSD) are working on the implementation of DCS in the Tung Chung New Town Extension (East) and Kwu Tung North New Development Area, at an estimated cost of \$3,918.2 million and \$5,787.7 million in money-of-the-day prices respectively. The charging arrangement of the two new DCS projects will be similar to that of the Kai Tak DCS, which aims to collect charges

from users to recover both the capital and operating costs over the system life of 30 years.

Regarding the enhancement measures, apart from being an energy-efficient air-conditioning system, the design of the two new DCS projects includes various forms of energy efficiency features and renewable energy technologies, including light-emitting diode lighting and photovoltaic systems. As regards greening features, there will be landscaping, roof greening and vertical greening in appropriate areas for environmental and amenity benefits.

(6) Since the commencement of operation of the Kai Tak DCS in 2013, there has only been one incident of water pipe burst that occurred in 2018. This was an isolated incident. The overall system operation including the district cooling services was not affected. After the incident, the EMSD requested the contractor to improve the management of the plant and to ensure proper inspection and maintenance of pipework. With reference to the experience of the Kai Tak DCS, the design of the new DCS projects has been enhanced. Flooding gates and sump pumps will be added to the DCS plants so that any water pipe burst can be handled within the shortest time. Each DCS plant will also be separated into several zones to prevent interruption to the operation of the whole plant in case of water pipe burst in a certain zone.