For discussion on
20 December 2010

Legislative Council
Panel on Environmental Affairs

District Cooling System at the Kai Tak Development

Introduction

This paper updates Members on the latest development of the capital works project 45CG – District Cooling System (DCS) at the Kai Tak Development (KTD) and seeks Members' support for the Administration's proposal to increase the APE for implementing DCS Phases I and II. Subject to Members' views, we will submit the proposal to the Public Works Subcommittee (PWSC) and Finance Committee (FC) for funding approval.

Background

2. On 5 June 2009, the FC approved the DCS at the KTD at an estimated capital cost of $1,671 million in money of-the-day (MOD) prices.

3. Upon funding approval by FC, we initiated the tendering procedures in July 2009. The returned tender prices of both the project costs and the operation costs far exceeded the original estimates.

4. In view of the abovementioned tender outcome and having reviewed the latest development plan of KTD, we had refined the work requirements with more detailed site information, and adjusted the original procurement strategy by implementing the DCS with three works phases, i.e. Phases I, II and III. An outline of the scope of work under various Phases is set out at the **Annex**. We considered the revised phasing approach would provide more reasonable costs and would also better tie in with the development plan of KTD.

5. In June and July 2010, the Administration briefed Members on the details of the alternative procurement strategy in two open meetings and one closed-door meeting. Members agreed to the Administration's plan to conduct the retendering exercise. The Administration had also written to the FC and the PWSC explaining the revised phasing approach in procuring DCS.

Returned Tenders for Phases I and II

6. In August 2010, the Administration initiated the tendering procedures for works under the first two phases. The tenders for Phases I and II returned on 24 September 2010 and 5 November 2010 respectively. Based on the returned tenders, we estimate that the capital cost of Phases I and II is $1,870 million in MOD prices.

7. Phase III will cover the works contracts for the installation of additional electrical and mechanical equipment and laying of chilled water distribution pipes to serve KTD Packages 2 and 3[1] users when their development programmes are firmed up at a later date. In view of the returned tenders of Phases I and II, we estimate that Phase III would cost about $1,780 million in MOD prices. However, given the scale of KTD, there may be adjustments to the design and implementation schedule of various projects, which may vary the cost of works under Phase III. The commencement of tender and works under this phase will match with the implementation timetables for projects under KTD Packages 2 and 3.

Current Project Estimate

8. The estimated cost of Phases I and II is about $1,870 million

[1] The latest development programme of KTD is broadly grouped into three packages with reference to their scheduled completion dates, as follows –

(a) Package 1 – scheduled for completion in 2013, including mainly the Cruise Terminal (CT) and non-domestic areas of a public housing estate;

(b) Packages 2 and 3 – scheduled for completion in 2016 and thereafter, including Tourism Node, hotels, private commercial and residential developments etc..

in MOD prices, which exceeds the approved project estimate (APE) for the whole DCS project by about $200 million. The current estimated total project cost is about $3,650 million in MOD prices, which exceeds the APE by about $1,980 million. The significant increase in the estimated project cost is due to the following -

(a) the latest market situation for major materials, electrical and mechanical equipment and construction works which are specifically adopted for DCS, such as large diameter thermal insulated underground chilled water pipes and accessories, high voltage high capacity air-conditioning chillers and construction of deep underground building structures near the seafront;

(b) additional costs of works due to project design development and changes in construction requirements such as additional structural reinforcement works for the underground plant rooms to allow for future ground developments which have not been allowed for in the original estimate;

(c) unexpected site constraints such as additional interfacing between the underground DCS pipes and other existing underground facilities at KTD requiring deeper excavation for DCS pipes laying and additional pipe jacking below utilities; and

(d) higher provision of price adjustment as a result of the increase in the overall project estimate and rising adjustment factor.

Reduction in Costs Brought by the Alternative Procurement Strategy

9. Compared to the original procurement strategy, under which the project is covered under a single Design, Build and Operate contract spanning over 17 years, the alternative procurement strategy allows greater scope to adjust the DCS schedule in line with changes in the development schedule of KTD. This strategy also minimizes idling of early investment in pipe layings and electrical and mechanical equipment installations. Moreover, this strategy reduces the high risk

premium over the extended project period and alleviates tenderers' concerns over the adequacy of price adjustments in the single contract arrangement under the original procurement strategy. In fact, comparing the results of the tenders for Phase I and Phase II against the result of the original tender exercise carried out in late 2009, we estimate that the alternative procurement strategy has produced a reduction in capital cost by over $150 million and a significant reduction in the operation cost by about $280 million for the whole operation period of the DCS from 2012/13 to 2026/27.

Need for DCS

10. Implementation of a DCS in the KTD will bring about significant environmental benefits. Given its high energy efficiency (35% more energy-efficient than traditional air-cooled air-conditioning system), the maximum annual saving in electricity consumption will be 85 million kilowatt-hour (kWh), with a corresponding reduction of 59,500 tonnes of carbon dioxide emission per annum for the planned total public and private non-domestic air-conditioned floor area of about 1.73 million square meters. As such, DCS can contribute to air quality improvement and the vision of achieving low carbon economy.

11. From the perspective of individual users, the DCS would bring about the following benefits -

(a) reduction in upfront capital cost for installing chiller plants at their buildings, the reduction is estimated to be about 5 – 10% of the total building cost;

(b) user buildings do not need to install their own chillers and the associated electrical equipment thus allowing more flexible building designs;

(c) the DCS is more adaptable than individual air-conditioning system to the varying demand for air-conditioning; and

(d) the service quality and reliability will be overseen by the Electrical and Mechanical Services Department (EMSD).

12. For the environment of the whole KTD, noise and vibration arising from the operation of heat rejection equipment and chillers of air-conditioning plants in buildings can be reduced as there will not be any need for such equipment for buildings subscribing to DCS.

13. DCS is one of KTD's major supporting facilities supporting the planning vision of a green web for sustainable development. There are strong public expectations that KTD is to become a green zone at the centre of Victoria Harbour. Various environmentally friendly initiatives will be introduced and adopted in the design of KTD thereby providing tangible benefits to the environment. The Cruise Terminal building (CT), which is amongst the first batch and most prominent public projects being developed at KTD, has been designed on the basis that DCS will be available for air-conditioning services.

Financial Viability

14. Our policy intention is to recover both the capital and operating costs from users over the project life which is estimated to be 30 years. All public projects[2] in KTD are mandated to subscribe to DCS service. These projects will account for up to 35% of the total air-conditioned floor area in KTD.

15. With a view to increasing the subscription rate and maximizing environmental benefit of the project, Members suggested at the meetings in July 2010 that all private non-domestic projects in the KTD should be obliged to subscribe to the DCS service.

16. The Government has actively explored the feasibility of the above suggestion and considered it a viable way of implementation to prescribe such a requirement to connect to the DCS in appropriate provisions in the land lease conditions. As a general practice for new developments on sale sites, Lands Department (LandsD) will check compliance with the land lease conditions before the issuance of Certificate of Compliance (CC)[3], which would only be issued to the

[2] For non-domestic areas only.

[3] A CC is issued to the grantee/buyer after all the positive obligations imposed under the General and Special Conditions of the land grant documents have been complied with to the satisfaction of the

developer by LandsD upon satisfactory compliance with the lease conditions. Insofar as the DCS is concerned, LandsD will invite EMSD's advice to ensure the compliance is to the satisfaction of EMSD.

17. The Government has started to gauge views from relevant stakeholders including the Real Estate Developers Association and relevant professional bodies such as the Hong Kong Institution of Engineers on the relevant requirement and arrangements. In implementing the relevant arrangements, we will seek to incorporate their views as far as possible.

18. According to our latest review, if all air-conditioned floor area of private non-domestic projects in the KTD uses the DCS service, the DCS is expected to break even within 25[4] years.

19. If the private non-domestic projects in the KTD might opt for subscription to the DCS service, taking into account the estimated capital and operating cost and assuming that the tariff could be adjusted annually in the same pace with the price level changes of recurrent expenditure, we estimate that DCS is expected to break even within its service life (30 years) if it could attain an overall subscription rate of about 73%. Apart from the public projects which are mandated to subscribe to DCS service, it means that subscription from about 58% of the air-conditioned floor area of private developments in KTD would be required.

20. Despite the competitiveness of DCS over other forms of air-conditioning systems, whether the project would be financially viable is still subject to a number of uncertain factors. These factors include the actual capital and recurrent costs, the evolving development schedule of KTD, the changes in tariff levels of DCS, etc.

Director of Lands or other authorities as prescribed.

[4] Counting from 2010/11 with a 100% subscription rate for connection to DCS at KTD.

Tariff Rate

21. The tariff for the use of district cooling services would be set at a competitive level comparable to the cost of individual water-cooled air-conditioning systems using cooling towers, which is one of the most cost-effective air-conditioning systems available in the market. We will introduce legislation for the Government to charge tariff for the DCS services.

Way Forward

22. In order to meet the development schedules of the earliest projects in KTD, including the CT and shopping arcade of the public housing estate, which have been designed on the basis that DCS will be available to provide air-conditioning services, we need to urgently proceed with relevant works in order to meet with the development schedules of various projects in KTD.

23. The pipe laying works of Phase I are to match the ongoing roadwork construction programme in North Apron to avoid delay in the roadwork construction programme or the need of re-opening the newly completed road.

24. We will submit to PWSC/FC for increasing the APE for implementing Phases I and II. Subject to the approval, the works under the two phases can commence in February and March 2011 respectively.

25. Subject to the progress and development programme of KTD, we will invite tenders for Phase III works in due course. Based on the outcome of such tender exercise, we will report to this Panel and seek PWSC and FC's approval for further increasing the APE to cover Phase III works.

Advice Sought

26. Members are invited to support for the Administration's proposal to increase the APE for implementing DCS Phases I and II.

Environment Bureau
December 2010

Annex

Alternative Procurement Strategy
Scope of Works under Various Phases

Phases	Period	Scope of Works	Operation Service
Phase I – Works contract for the pipe laying work for part of KTD Package 1	2010/11 – 2012/13	• Pipe laying from northern chiller plant room for provision of chilled water to public housing estate project etc. to meet the roadwork programme in the North Apron	
Phase II – DCS core services under DBO arrangement	2011/12 – 2018/19 (8 years) (with an option for extending the operation period for 8 years up to end 2026/27)	• Design for the whole DCS • Building and engineering works, the northern chiller plant room, southern underground chiller plant room and the seawater pumphouse • Laying of chilled water distribution pipes not covered in Phase I for Package 1 users • E&M equipment for KTD Package 1 users	• Operation of DCS up to 2018/19, and possibly up to 2026/27 (for users of all package) assuming extension of operation contract

Phases	Period	Scope of Works	Operation Service
Phase III – E&M installation and pipe laying for KTD Packages 2 and 3 users	2013/14 – 2020/21 (Note)	• Laying works of chilled water distribution pipes for KTD Packages 2 and 3 users • Provision of E&M equipment for KTD Packages 2 and 3 users	

Note – Commencement date of the works under Phase III is subject to the finalised timetables for projects under KTD Packages 2 and 3.