For discussion on

8 December 2014

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Legislative Council Panel

on Information Technology and Broadcasting

Building a Government Data Centre Complex

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Purpose

This paper seeks Members' support on the proposal to conduct pre-construction consultancy services for carrying out the design and site investigation for the construction works of a Government Data Centre Complex (the Complex).

The Problem

2.   Currently, government data centres are hosted in different locations and usually co-located with the relevant Government Bureaux and Departments (B/Ds) in general office buildings.   These data centres are built at different times.   About 80% of the Government data centres have reached their capacity limits in terms of space, power and cooling

efficiency.   Given their locations, there are limitations as to the extent to which improvements in terms of capacity and efficiency could be made to these existing facilities.   It is also impossible to build on such data centres to meet the increasing demand for data centre services.

3.   To address the problem, the Office of the Government Chief Information Officer completed a consultancy study (the Study) in 2012 to formulate a blueprint for the sustainable arrangements of data centre services with a view to addressing the long-term hosting needs of the government information technology (IT) services.   The Study recommends that the best approach is for the Government to establish a consolidated complex to address such needs of the Government as far as possible in a holistic manner so as to achieve better economy of scale, cost effectiveness as well as greener management in the overall government data centre operations.   The Study also recognises that some B/Ds may need to operate their own data centres due to specific statutory, business or operational needs, and some may engage public cloud services or outsourcing to meet specific, urgent or short-term demand on hosting services.   We agree with the recommendations.   With the establishment of the Complex, B/Ds will be required to consider moving their data centres into the Complex whenever there is a need to relocate existing data centres or to satisfy new data centre demands which cannot be met by the existing data centres.   This step-by-step and pragmatic

approach in consolidating the data centre services of B/Ds can strike a balance between the economic benefit achieved through consolidation and the relocation cost.

Project Scope and Nature

4.   To support the long-term development of data centre services in B/Ds, we plan to build the Complex to address the hosting demands of government IT services in a coordinated manner to synergise the government data centre operations and enable B/Ds to become more agile and adaptable to changes in business needs and the latest technology advancement.   This initiative was included as one of the new policy initiatives of the Commerce and Economic Development Bureau reported to Members in January 2013 via LC Paper No. CB(4)310/12-13(01).

5.   As the data centre sector has been growing fast in Hong Kong in recent years, we envisage that Government can benefit from the industry's expertise and domain knowledge on data centre design by conducting a pre-construction consultancy to ensure that the design of the Complex adopts industry best practices and its subsequent construction can attain better control on cost and quality.   The scope of the pre-construction consultancy services comprises:

    (a)   design of the following aspects for the Complex:

(i) purpose-built data centre building at King Lam Street of Cheung Sha Wan (the site is about 1 400 square metres (m^2) with a construction floor area of about 12 400 m^2, location and site plan is at **Enclosure**) to provide data centre halls with around 1 400 racks for placement of servers and IT facilities of B/Ds, as well as the accommodation for supporting the data centre operations;

(ii) critical infrastructure facilities including uninterruptible power supply (UPS) system, network cabling infrastructure and supplementary cooling and hot/cold aisle solutions; and

(iii) associated environmental mitigation measures;

(b) site investigation works and minor studies for the design work described in 5(a) above; and

(c) preparation of tender documents (including tender drawings) and assessment of tenders for construction of the Complex according to the scope of design work described in paragraph 5(a) above.

6. Subject to the funding approval by the Finance Committee (FC), we plan to commence the pre-construction consultancy services in mid-2015. Upon completion of the pre-construction consultancy services, we shall seek further funding approval from the FC for the

actual construction works, construction consultancy and supervision, testing and commissioning, and post-handover services.

Detailed Justifications

Ageing Government Data Centre Design and Facilities

7.   The use of IT services in the Government is growing at a fast pace to cope with the ever increasing public demand for reliable and convenient e-Government services anytime and anywhere.   To cater for the increasing public demands for e-Government services, the Government is adopting cloud computing to meet the rising computing demand in a fast, flexible and scalable manner.   While having quantum jumps in processing power, IT equipment, including that in respect of cloud computing, also demands higher electrical power and cooling capacity than legacy equipment.

8.   More than 60% of the existing Government data centres have already been set up and used for over 15 years.   Their old traditional designs cannot cope with the demands of high density computing environment.   Moreover, as mentioned above, there are considerable constraints of the existing data centres (e.g., insufficient headroom, no additional space for new facilities to enhance electrical power and cooling

capacity) that greatly limit the opportunity for enhancement. A newly designed Complex can provide a data centre environment with high power density and cooling efficiency to support the cloud computing infrastructure. It can also enhance the agility, reliability, security, capacity and availability of government data centre services by modernising and transforming these data centres, and bring about performance and energy efficiency improvements with the aid of the latest technologies.

Synergising Government Data Centre Facilities and Services

9.　　　The project seeks to address the need of hosting government IT services in a holistic manner, with a view to reaping the benefits arising from economy of scale and technology advancement. The Complex will -

(a)　replace existing government data centres with relocation needs, including those affected by the relocation initiative of the three government office buildings at the Wan Chai waterfront;

(b)　accommodate data centre services for B/Ds which need to switch their IT operations from outsourced data centres to government data centres so as to avoid potential risks of service interruption and significant increase in service cost arising from contract renewal or change of service providers; and

(c)   enhance data centre capacities in addressing the needs arising from the implementation of new e-Government services.

10.   Through regular reviews with B/Ds on their demands for data centre services, we continuously explore opportunities to consolidate the existing government data centres and accommodate the new demands. At the present stage, we expect the Complex to provide accommodation for four existing government data centres[1] as well as the new data centre services of five B/Ds[2]. Amongst the five B/Ds with new demands, four of them will need to use outsourced data centre services as an interim arrangement before the Complex comes into operation. Through the consolidation of data centre facilities and operations, the Complex can improve synergy and flexibility in terms of resource sharing so that the Government as a whole will spend less in both capital investment and recurrent operation in data centre services. Building the Complex can also save B/Ds the burden, overheads and additional resources in building their own data centres, and avoid duplication of preparatory and implementation works such as site identification, feasibility study, funding acquisition, design, construction, testing and commissioning.

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[1] The four existing government data centres belong to the Census and Statistics Department, Leisure and Cultural Services Department, Office of the Government Chief Information Officer and The Treasury.

[2] The five B/Ds are the Education Bureau, Food and Health Bureau (Electronic Health Record Sharing System), Hong Kong Observatory, Hong Kong Police Force and Immigration Department.

Enforcing IT Security and Service Availability

11.　　All existing government data centres are operating in full compliance with the Government's security policies, guidelines and procedures to maintain confidentiality, integrity and accessibility of IT services and data.　The Complex will adopt the same security standards. In addition, the Complex will be a purpose-built facility operating in permanent government-owned premises and dedicated to the use of government data centre for easy control and monitoring.　Together with the built-in security features that will be brought by the new data centre design, the Complex will provide strong control on the data centre building, facilities, systems and data to meet the necessary security standards to protect against security threats and address public concerns on information security.

12.　　The Complex is a critical infrastructure of the Government to support e-Government services for bringing convenience and better quality of life to the public.　It will be built with high availability design to mitigate the potential risks of data centre service outage.

Greener Operation of Government Data Centre Services

13.　　Electricity consumption of data centres is huge.　Green data

centre design, building, management and operation practices are widely adopted worldwide. The Complex will be built with advanced green technologies and modern power-saving design that will reduce operational cost, energy consumption and carbon footprint. Currently, the government data centres are accommodated in general government offices. Due to non-purpose-built, legacy designs and ageing facilities, energy efficiency level of these data centres is lagging behind their commercial counterparts in Hong Kong. The power usage effectiveness ("PUE", lower PUE refers to more effective use of power) of government data centres currently stands at an average of around 2.0 to 3.0. The target PUE of the Complex would be about 1.6, which is on par with the normal PUE value of other data centres in Hong Kong. The Complex will be a showcase for the implementation of green design, building and operation practices, and serve as an example for B/Ds which operate their own data centres to implement green data centre initiatives.

Financial Implications

14.   It is estimated that the capital cost for carrying out the pre-construction consultancy services will be $52.6 million in money-of-the-day prices, subject to the approval of the FC tentatively in early 2015.

Public Consultation

15.   We consulted the Sham Shui Po District Council on the project on 2 September 2014. Members of the District Council supported the project and advised that the Complex should put in place sufficient security measures to protect against physical attacks, and incorporate such green features as vertical greening and utilisation of solar energy.

Way Forward

16.   Subject to Members' support, we plan to seek funding approval from the FC after consultation with the Public Works Subcommittee.

Office of the Government Chief Information Officer

Commerce and Economic Development Bureau

December 2014

Location and site plan