For discussion **PWSC(2015-16)62**
on 16 March 2016

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 705 – CIVIL ENGINEERING
Civil Engineering – Multi-purpose
45CG – District Cooling System at the Kai Tak development

Members are invited to recommend to Finance Committee to increase the approved project estimate of **45CG** by $153.7 million from $3,752 million to $3,905.7 million in money-of-the-day prices for implementing Phase III (Package C) of the District Cooling System at the Kai Tak development.

PROBLEM

We need to implement Phase III (Package C) (Phase IIIC) of the District Cooling System (DCS) to meet the development schedule of the projects at the Kai Tak development (KTD). The approved project estimate (APE) of **45CG** is not sufficient to cover the costs of Phase IIIC of the project.

PROPOSAL

2. The Director of Electrical and Mechanical Services, with the support of the Secretary for the Environment, proposes to increase the APE of **45CG** by $153.7 million from $3,752 million to $3,905.7 million in money-of-the-day (MOD) prices for implementing Phase IIIC of the project.

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3. Subject to the progress and development programme of KTD, we will consider the need and the programme for the remaining works under Phase III[1] in due course, and seek support from the Public Works Subcommittee (PWSC) and Finance Committee (FC) for further increasing the APE to cover those works.

PROJECT SCOPE AND NATURE

4. The proposed scope of works under Phase IIIC comprises laying chilled water distribution pipe networks at a length of about 1 600 metres (m) at a section of the Road D1 and 600 m at a section of the Road L7 to match with the construction programme of Road D1 (Part) and Road L7 in KTD. This arrangement enables coordination with the installation of other underground utilities, and can minimise the need for utility diversion, and/or re-opening of newly completed roads for installing DCS pipes. The laying of DCS chilled water pipe is necessary for the provision of district cooling services to the buildings along Road D1 and Road L7.

5. An outline of the proposed scope of works and a layout of DCS pipe networks under various phases are set out at Enclosures 1 and 2 respectively.

6. Subject to FC's funding approval by mid-2016, we plan to commence the construction works for Phase IIIC in September 2016 for completion in the first quarter of 2020.

JUSTIFICATION

7. The DCS is a major infrastructure in support of the sustainable and environmentally-friendly development at Kai Tak. To promote energy efficiency and conservation, and with the support of the Legislative Council (LegCo), the Government is constructing a first-of-its-kind DCS at KTD supporting a planned total of about 1.73 million square metres of non-domestic air-conditioned gross floor areas, requiring about 284 megawatt of refrigeration cooling capacity.

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[1] The scope of the remaining works under Phase III includes the installation of electrical and mechanical equipment and pipe laying for remaining KTD Packages II and III. Details are set out in Enclosure 1.

8. The DCS is an energy-efficient air-conditioning system, consuming 35% and 20% less electricity as compared with traditional air-cooled air-conditioning systems and individual water-cooled air-conditioning systems (WACS) using cooling towers respectively. The technology has been widely adopted in other parts of the world, such as Singapore, Europe and the United States.

9. Implementation of the DCS in the KTD will bring about significant environmental benefits. Due to better energy efficiency, the maximum annual saving in electricity consumption upon completion of the entire DCS project is estimated to be 85 million kilowatt-hour (or about 35% reduction as compared with the original electricity consumption of 243 million kilowatt-hour without the DCS), with a corresponding reduction of 59 500 tonnes of carbon dioxide emission per annum. As such, DCS is expected to contribute to carbon reduction.

10. Apart from energy saving, the DCS will bring about the following benefits for individual users –

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

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

(c) reduced heat island effects in KTD and no noise and vibration arising from the operation of heat rejection equipment and chillers of air-conditioning plants in buildings, as such equipment will no longer be necessary for buildings subscribing to district cooling services. Also, the DCS can contribute to the vision of achieving low carbon economy; and

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(d) a more adaptable air-conditioning system to the varying demand as compared with individual air-conditioning systems. Each user building may adjust its contract cooling capacity by putting up a written application to the Electrical and Mechanical Services Department (EMSD)[2], without carrying out extensive modification works for the building in question.

Urgency of Phase IIIC

11. The laying of underground pipes under Phase IIIC will have to tie in with the construction programme of Road D1 (Part) and Road L7 in the former north apron area at the Kai Tak Airport. This can minimise the need for utility diversions, and/or subsequent re-opening of newly completed road for installing DCS pipes at a later stage.

12. To achieve better co-ordination and interface, the DCS pipe laying works to be funded under Phase IIIC will be entrusted to Civil Engineering and Development Department (CEDD) for implementation together with the Stage 3B and Stage 5A infrastructure works at the former north apron area[3] whose funding will be sought separately.

Project Estimate up to Current Development

13. The estimated cost of Phases I, II, IIIA and IIIB of **45CG** is $3,752 million in MOD prices. Together with the estimated cost of $153.7 million in MOD prices for Phase IIIC under the project, the estimated project cost of **45CG** up to current development is $3,905.7 million in MOD prices. The latest estimated cost for the remaining works under Phase III is $1,039.8 million in MOD prices. The estimated project cost up to current development for all phases of **45CG** is therefore $4,945.5 million in MOD prices. This is the same as we last estimated when seeking additional funding for DCS Phase IIIB in June 2015 vide PWSC(2015-16)29.

/**FINANCIAL** …..

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[2] The user building should put up a written application to EMSD one year before the proposed date for the adjusted cooling capacity to take effect. While it may take some time for EMSD to confirm the cooling demand of the building and revise the contract cooling capacity accordingly, EMSD will make its best efforts to provide the user building with the required cooling capacity under normal operating conditions of the DCS.

[3] CEDD plans to seek funding approval from FC within the current legislative session for upgrading part of **469CL**, entitled "Kai Tak development – stages 3B and 5A infrastructure works at former north apron area".

FINANCIAL IMPLICATIONS

14. We estimate the capital cost of the proposed works of Phase IIIC under the project to be $153.7 million in MOD prices, broken down as follows –

		$ million	
(a)	Mains laying	109.2	
(b)	Environmental mitigation measures	0.9	
(c)	Consultants' fees for contract administration	1.5	
(d)	Resident site staff (RSS) costs	11.0	
(e)	Contingencies	12.3	
	Sub-total	134.9	(in September 2015 prices)
(f)	Provision for price adjustment	18.8	
	Total	153.7	(in MOD prices)

A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Enclosure 3.

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15. Subject to approval, we will phase the expenditure of Phase IIIC works as follows –

Year	$ million (Sept 2015)	Price adjustment factor	$ million (MOD)
2016-17	6.2	1.05775	6.6
2017-18	91.0	1.12122	102.0
2018-19	33.6	1.18849	39.9
2019-20	3.2	1.25980	4.0
2020-21	0.9	1.33539	1.2
	134.9		153.7

16. The latest cash flow for Phases I, II, IIIA, IIIB and IIIC of the DCS is set out in Enclosure 4. Comparison of the cost breakdown of the APE and the latest project estimate (PE) is at Enclosure 5.

17. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period 2016 to 2021. The contract will provide adjustments for price fluctuation.

18. The latest estimates on the annual recurrent costs arising from this project are at Enclosure 6. The District Cooling Services Ordinance (Cap. 624), which was passed by LegCo in March 2015, provides that subject to the approval of the Financial Secretary, the recurrent costs arising from this project, including the operation and maintenance fees for the contractor and utility charges for operating the DCS plants, may be offset by the district cooling services charges collected.

19. When we sought FC's approval for upgrading **45CG** to Category A in June 2009 (PWSC(2009-10)24 refers), we proposed that private non-domestic developments would be connected to DCS on a voluntary basis. For the purpose of increasing the subscription rate and maximising environmental benefit of the project, Members of the LegCo Panel on Environmental Affairs suggested in July 2010 that all private non-domestic projects in the KTD be obliged to subscribe to the district cooling services.

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20. The Government has actively explored the feasibility of the above suggestion and considered it feasible to stipulate the requirement to connect to the DCS in the conditions of sale for the sale sites for non-domestic development. In general, Lands Department (LandsD) will check compliance with the positive obligations in the conditions of sale on completion of the new development on the sale site before the issuance of Certificate of Compliance, which would only be issued to the purchaser of the site by LandsD upon satisfactory compliance with the positive obligations. Insofar as the DCS requirement is concerned, LandsD will consult EMSD to ensure that the requirement for connection to DCS has been complied with to the satisfaction of EMSD.

Charge Rate

21. The district cooling services charges has been 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 market. We also intend to recover both the capital and operating costs from DCS consumers over the project life, which is estimated to be 30 years, as taxpayers should not subsidise such air-conditioning charges.

PUBLIC CONSULTATION

22. We consulted the LegCo Panel on Development on the proposed works under Phase IIIC on 23 February 2016. Members generally supported the submission of the proposal to PWSC for consideration. The Government provided supplementary information required by the Panel on 9 March 2016.

23. We have consulted the following parties which supported the implementation of DCS at the KTD –

(a) the Energy Efficiency and Conservation Sub-committee of the Energy Advisory Committee on 24 October 2008; and

(b) the Environment and Hygiene Committee of the Kwun Tong District Council on 2 December 2008.

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24. In addition, we consulted the following parties which had no objection to the implementation of DCS at the KTD –

(a) Wong Tai Sin District Council on 18 November 2008;

(b) the Housing and Infrastructure Committee of the Kowloon City District Council on 11 December 2008; and

(c) the Habourfront Enhancement Committee on 15 December 2008.

25. The Metro Planning Committee of the Town Planning Board (TPB) approved on 13 February 2009 the planning application for the underground DCS, including chiller plant cum seawater pump house, and above-ground operational facilities within the "Open Space", "Commercial (4)" and "Residential (Group C)" zones at the middle section of the ex-Kai Tak Airport runway. On 31 August 2012, Director of Planning, under the delegated authority of TPB, approved the minor amendments to the approved scheme regarding the change of gross floor area and disposition of the above-ground facilities of chiller plant, which were proposed to suit the design of the road situated above the related facilities.

ENVIRONMENTAL IMPLICATIONS

26. **45CG**, which forms part of the KTD, is not a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). The engineering feasibility study of the KTD is a designated project under Schedule 3 of the EIAO, requiring an EIA report to be approved under the EIAO. The environmental acceptability of the proposed DCS development has been addressed in the KTD EIA report, which was approved by the Director of Environmental Protection on 4 March 2009 and concluded that the DCS would not cause adverse long term environmental impacts.

27. For short term construction impacts, we will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of mitigation measures. These include the use of quiet construction plant, silencers, mufflers, acoustic lining or shields for noisy construction activities, frequent cleansing and watering of the site, and provisions of wheel-washing facilities. We will also carry out site inspections to ensure that these recommended mitigation measures and good site practices are properly followed and implemented. We have included in the project estimates the cost for the implementation of these mitigation measures.

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28. At the planning and design stages, we have considered the piping alignment, design level and construction method of the proposed works to reduce the generation of construction waste where possible. In addition, the contractors will be required to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities[4]. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

29. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

30. We estimate that the project will generate in total 41 495 tonnes of construction waste. Of these, we will reuse 24 897 tonnes (60.0%) of inert construction waste on site and deliver 15 622 tonnes (37.6%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of 976 tonnes (2.4%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be $0.5 million for this project (based on a unit charge rate of $27 per tonne for disposal at public fill reception facilities and $125 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

31. The proposed works would not affect any declared monuments, proposed monuments, graded historic sites and buildings, sites of archaeological interest and historic sites identified by the Antiquities and Monuments Office within the work site.

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[4] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

LAND ACQUISITION

32. The proposed works do not require any resumption of private land.

BACKGROUND INFORMATION

33. With the support of the LegCo Panel on Environmental Affairs, the Government sought FC's funding approval for implementing DCS Phases I and II on 18 February 2011 at an APE of $1,861.8 million in MOD prices[5]. The construction works for Phase I and those for Phase II of DCS were completed in the first quarter of 2013 and the third quarter of 2014 respectively.

34. To tie in with the developments and infrastructure works at KTD, the Government sought FC's funding approval for implementing Phase III (Package A) (Phase IIIA) and Phase III (Package B) (Phase IIIB) at an APE of $1,284.1 million and $606.1 million on 21 June 2013 and 14 July 2015 respectively. The total APE for Phase I, II, IIIA and IIIB works is $3,752 million in MOD prices. On top of the $153.7 million under the current application for Phase IIIC implementation, we plan to seek funding approval from LegCo for the remaining works under Phase III at an estimated cost of $1,039.8 million in MOD prices, in the next two years depending on the development schedule of KTD. We also informed PWSC/FC when seeking additional funding for DCS Phase IIIB in June 2015 vide PWSC(2015-16)29 that subject to the progress and development programme of KTD, we would invite tenders for remaining Phase III works and seek funding approval from PWSC and FC in due course.

35. At the PWSC meeting on 31 October 2001, to enable Members to consider projects relating to the entire KTD (formerly known as South East Kowloon development) more easily, some Members suggested and the Administration agreed to include information on the progress, scope and approved project estimates of all the KTD Public Works Programme items in future KTD related PWSC submissions. In this connection, the Development Bureau has separately submitted PWSC(2015-16)61 on **469CL** "Kai Tak development – stages 3B and 5A infrastructure works at former north apron area" for consideration together with this application.

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[5] FC approved the DCS at KTD at an APE of $1,671 million in MOD prices in June 2009. Given that the returned tender price far exceeded the original estimates, and having reviewed the latest development plan of KTD, we adjusted the procurement strategy by implementing the DCS in three phases, i.e. Phases I, II and III, which produced more reasonable cost estimates and could better tie in with the development plan of KTD.

36. Of the 12 trees within the works boundary of Phase IIIC of the project, one tree will be preserved. The proposed works will involve the felling of 11 trees and the transplanting of one tree. No important trees[6] are identified within the project boundary. We will incorporate planting proposals as part of the proposed works.

37. We estimate that the proposed works will create about 37 jobs (30 for labourers and another seven for professional or technical staff) providing a total employment of 1 470 man-months.

Environment Bureau
March 2016

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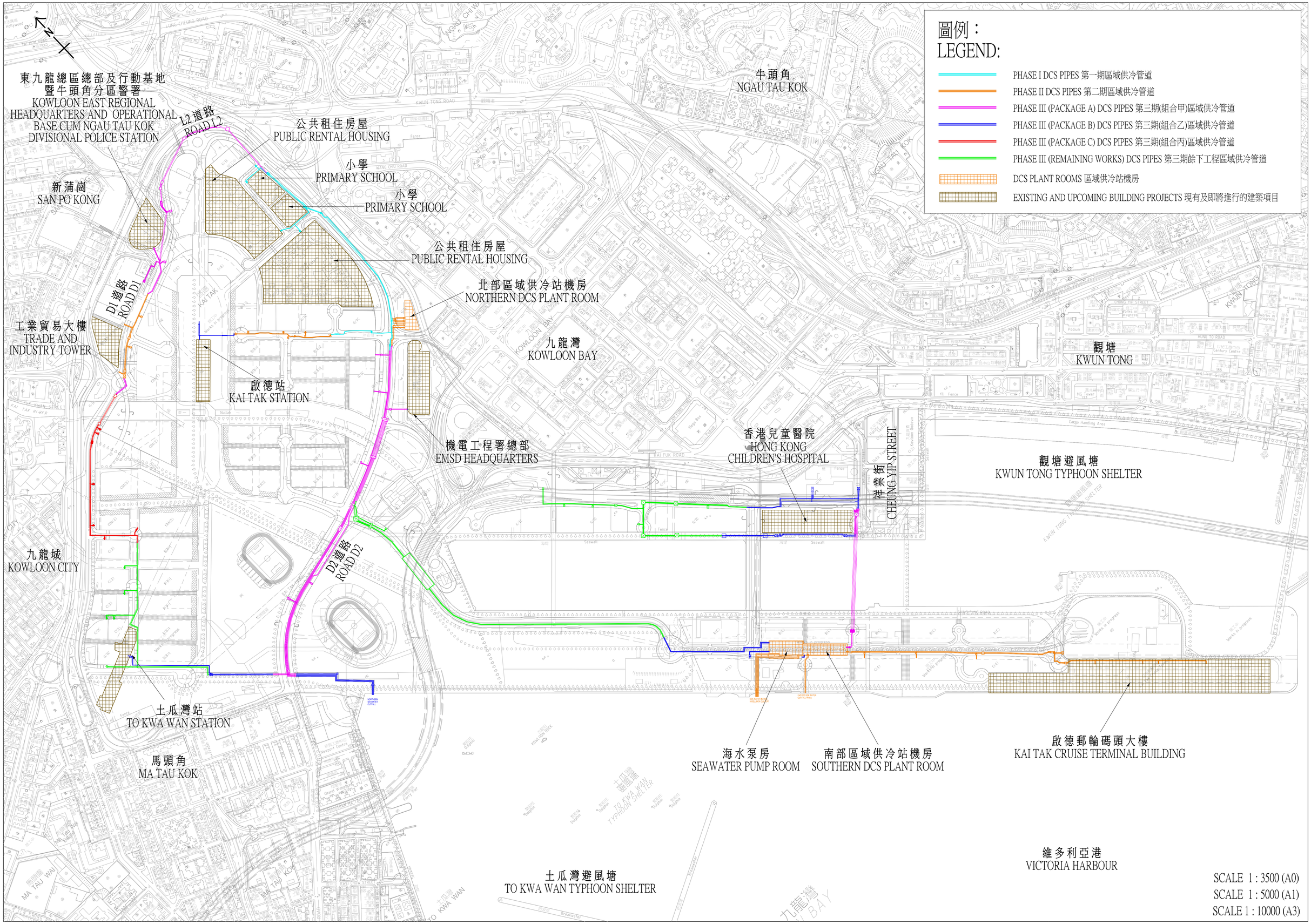
[6] "Important trees" refers to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, trees as landmark of monastery or heritage monument, and trees in memory of an important person or event;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
(e) trees with trunk diameter equal or exceeding 1.0 metres (m) (measured at 1.3 m above ground level), or with height / canopy spread equal or exceeding 25 m.

Enclosure 1 to PWSC(2015-16)62

District Cooling System (DCS) at the Kai Tak development (KTD)
Scope of Works under Various Phases

Phases	Period	Scope of Works
Phase I – Works contract for the pipe laying work for part of KTD Package I	2010/11 – 2012/13	◆ pipe laying from northern chiller plant room for provision of chilled water to Ching Long Shopping Centre under the Hong Kong Housing Authority to meet the roadwork programme in the North Apron.
Phase II – DCS core services under Design, Build and Operate arrangement	2010/11 – 2019/20 (with an option for extending the operation period for eight years)	◆ design for the whole DCS; ◆ building and engineering works, the northern chiller plant room, southern underground chiller plant room and the seawater pumphouse to support the operation of the entire DCS; ◆ laying of chilled water distribution pipes not covered in Phase I for Package I users (Kai Tak Cruise Terminal building); ◆ electrical and mechanical (E&M) equipment for KTD Package I users; and ◆ operation of DCS up to 2019/20, and possibly for eight more years (for users of all packages) assuming extension of operation contract.
Phase III (Package A) – E&M installations and pipe laying for part of KTD Packages II and III	2013/14 – 2017/18	◆ pipe laying works to match with the programme of road construction and upcoming building developments including Trade and Industry Tower and Hong Kong Children's Hospital; and ◆ provision of E&M equipment for the above building developments and two schools.

Phase III (Package B) – E&M installations and pipe laying for part of KTD Packages II and III	2015/16 – 2018/19	◆ pipe laying works to match with the programme of road construction and upcoming building developments including the Electrical and Mechanical Services Department Headquarters, To Kwa Wan Station and Kai Tak Station of the Shatin to Central Link, and the proposed Kowloon East Regional Headquarters and Operational Base cum Ngau Tau Kok Divisional Police Station; ◆ provision of E&M equipment for the above building developments; and ◆ consultancy services for pre-construction stage (design) of the remaining Phase III works to tie in with the ongoing and upcoming programmes on the developments and infrastructure works carried out by CEDD.
Phase III (Package C) – Pipe laying for part of KTD Packages II and III	2016/17 – 2019/20	◆ pipe laying works to match with the programme of road construction of Road D1 (Part) and Road L7.
Other works under Phase III – E&M installations and pipe laying for remaining KTD Packages II and III	2017/18 – 2021/22	◆ pipe laying works for remaining works in KTD to match with the overall development programme; and ◆ provision of E&M equipment for the above developments.


圖例：
LEGEND:
PHASE I DCS PIPES 第一期區域供冷管道
PHASE II DCS PIPES 第二期區域供冷管道
PHASE III (PACKAGE A) DCS PIPES 第三期(組合甲)區域供冷管道
PHASE III (PACKAGE B) DCS PIPES 第三期(組合乙)區域供冷管道
PHASE III (PACKAGE C) DCS PIPES 第三期(組合丙)區域供冷管道
PHASE III (REMAINING WORKS) DCS PIPES 第三期餘下工程區域供冷管道
DCS PLANT ROOMS 區域供冷站機房
EXISTING AND UPCOMING BUILDING PROJECTS 現有及即將進行的建築項目
東九龍總區總部及行動基地
暨牛頭角分區警署
KOWLOON EAST REGIONAL HEADQUARTERS AND OPERATIONAL BASE CUM NGAU TAU KOK DIVISIONAL POLICE STATION
L2道路
ROAD L2
公共租住房屋
PUBLIC RENTAL HOUSING
小學
PRIMARY SCHOOL
小學
PRIMARY SCHOOL
新蒲崗
SAN PO KONG
公共租住房屋
PUBLIC RENTAL HOUSING
北部區域供冷站機房
NORTHERN DCS PLANT ROOM
D1道路
ROAD D1
工業貿易大樓
TRADE AND INDUSTRY TOWER
啟德站
KAI TAK STATION
機電工程署總部
EMSD HEADQUARTERS
牛頭角
NGAU TAU KOK
九龍灣
KOWLOON BAY
觀塘
KWUN TONG
香港兒童醫院
HONG KONG CHILDREN'S HOSPITAL
祥業街
CHEUNG YIP STREET
觀塘避風塘
KWUN TONG TYPHOON SHELTER
九龍城
KOWLOON CITY
D2道路
ROAD D2
土瓜灣站
TO KWA WAN STATION
馬頭角
MA TAU KOK
海水泵房
SEAWATER PUMP ROOM
南部區域供冷站機房
SOUTHERN DCS PLANT ROOM
啟德郵輪碼頭大樓
KAI TAK CRUISE TERMINAL BUILDING
土瓜灣避風塘
TO KWA WAN TYPHOON SHELTER
維多利亞港
VICTORIA HARBOUR
SCALE 1 : 3500 (A0)
SCALE 1 : 5000 (A1)
SCALE 1 : 10000 (A3)

Enclosure 3 to PWSC(2015-16)62

45CG – District Cooling System at the Kai Tak development

Breakdown of the estimates for consultants' fees and resident site staff costs for Phase IIIC (in September 2015 prices)

		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($million)
(a) Consultants' fees for contract administration	Professional	8	38	2.0	1.2
	Technical	6	14	2.0	0.3
(b) Resident site staff cost (Note 2)	Professional	35	38	1.6	4.2
	Technical	166	14	1.6	6.8
				Total	**12.5**

* MPS = Master Pay Scale

Notes

1. A multiplier of 2.0 is applied to the average MPS salary point to estimate the cost of staff to be employed in the consultants' offices. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants (as at now, MPS salary point 38 = $74,210 per month, and MPS salary point 14 = $25,505 per month).

2. The actual man-months and actual costs will only be known after the completion of the construction works.

Enclosure 4 to PWSC(2015-16)62

45CG – District Cooling System at the Kai Tak development

Table 1 - Latest cash flow for Phases I, II, IIIA, IIIB and IIIC

Year	Phases I, II, IIIA & IIIB	Phase IIIC	Phases I, II, IIIA, IIIB & IIIC
	Latest PE ($ million MOD prices) (a)	Latest PE ($ million in MOD prices) (b)	Latest PE ($ million in MOD prices) (c) = (a) + (b)
2010 – 2011	14.3	–	14.3
2011 – 2012	435.8	–	435.8
2012 – 2013	876.0	–	876.0
2013 – 2014	566.8	–	566.8
2014 – 2015	488.8	–	488.8
2015 – 2016	446.0	–	446.0
2016 – 2017	323.1	6.6	329.7
2017 – 2018	385.1	102.0	487.1
2018 – 2019	120.9	39.9	160.8
2019 – 2020	60.8	4.0	64.8
2020 – 2021	34.1	1.2	35.3
2021 – 2022	0.3	0.0	0.3
Total	**3,752.0**	**153.7**	**3,905.7**

Table 2 - Latest cash flow and provision for price adjustment for all Phases

Year	PE in PWSC (2015-16)29 # ($ million in Sept 2014 prices) (a)	Price adjust-ment factors in PWSC (2015-16) 29# (b)	PE in PWSC (2015-16)29 # ($ million in MOD prices) (c)	Latest PE ($ million in Sept 2015 prices) (d)	Latest price adjust-ment factors (Sep 2015)* (e)	Latest PE ($ million in MOD prices)^ (f)
2010 – 2011	14.3	1	14.3	14.3	1	14.3[+]
2011 – 2012	435.8	1	435.8	435.8	1	435.8[+]
2012 – 2013	876.0	1	876.0	876.0	1	876.0[+]
2013 – 2014	566.8	1	566.8	566.8	1	566.8[+]
2014 – 2015	488.8	1	488.8	488.8	1	488.8[+]
2015 – 2016	459.7	1.05725	486.0	446.0	1	446.0[+]
2016 – 2017	660.8	1.12069	740.6	311.7	1.05775	329.7
2017 – 2018	406.4	1.18793	482.8	625.8	1.12122	701.7
2018 – 2019	242.8	1.25920	305.7	441.0	1.18849	524.1
2019 – 2020	145.7	1.33475	194.5	225.1	1.25980	283.6
2020 – 2021	209.4	1.40483	294.2	165.8	1.33539	221.4
2021 – 2022	36.6	1.47507	54.0	4.2	1.40549	5.9
2022 – 2023	3.9	1.54882	6.0	26.8	1.47577	39.6
2023 – 2024	0.0	1.62626	0.0	7.6	1.54956	11.8
Total	**4,547.0**		**4,945.5**	**4,635.7**		**4,945.5**

[+] Actual expenditure up to March 2016.

\# As per Enclosure 4 to PWSC(2015-16)29 when we sought PWSC's endorsement of APE increase for Phases I, II, IIIA and IIIB of **45CG** on 16 June 2015. We estimated at the time that the cost for Phase III would be $1,193.5 million in MOD prices and that the estimated project cost for all phases would be about $4,945.5 million in MOD prices.

* Price adjustment factors adopted in September 2015 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 6% per annum over the period from 2016 to 2020, 5% per annum over the period from 2021 to 2023 and 4.5% in 2024.

^ FC approved the implementation of Phases I, II, IIIA and IIIB on 14 July 2015 at an APE of $3,752 million in MOD prices. Taking into account the proposed APE increase for Phase IIIC by $153.7 million in MOD prices and the estimated cost of $1,039.8 million in MOD prices for the remaining works of Phase III, there is no change to the estimated project cost for all phases (viz. $4,945.5 million in MOD prices).

Enclosure 5 to PWSC(2015-16)62

45CG – District Cooling System at the Kai Tak development

Comparison between existing APE for Phases I II, IIIA and IIIB and the latest project estimate for Phases I, II, IIIA, IIIB and IIIC

A comparison of the existing APE for Phases I, II, IIIA and IIIB and the latest project estimate for Phases I, II, IIIA, IIIB and Phase IIIC is as follows –

		(A) Existing APE for Phases I, II, IIIA & IIIB	(B) Latest Project Estimate for Phases I, II, IIIA, IIIB & IIIC	(B) – (A) Difference
			($ million in MOD prices)	
(a)	DCS plants			
	(i) civil works	897.0	897.0	0.0
	(ii) E&M works	531.1	531.1	0.0
(b)	Mains laying	1,451.5	1,560.7	109.2
(c)	Connection facilities at user buildings	35.9	35.9	0.0
(d)	Environmental mitigation measures	19.1	20.0	0.9
(e)	Consultants' fee for contract administration	30.1	31.6	1.5
(f)	Resident site staff costs	146.8	157.8	11.0
(g)	Contingencies	211.5	223.8	12.3
(h)	Provision for price adjustment	429.0	447.8	18.8
	Total	**3,752.0**	**3,905.7**	**153.7**

1. **As regards item (b) (mains laying)**, the increase of $109.2 million is for laying part of chilled water distribution pipe networks at a length of about 1 600 metres (m) at a section of the Road D1 and 600 m at a section of the Road L7.

2. **As regards item (d) (environmental mitigation measures)**, the increase of $0.9 million is for environmental mitigation measures such as water, noise and air pollution control for DCS Phase IIIC works.

3. **As regards item (e) (consultants' fee for contract administration)**, the increase of $1.5 million is for consultants' fee for contract administration for DCS Phase IIIC works.

4. **As regards item (f) (resident site staff costs)**, the increase of $11 million is for resident site staff for DCS Phase IIIC works.

5. **As regards item (g) (contingencies)**, the increase of $12.3 million is the cost estimation for contingency for DCS Phase IIIC works.

6. **As regards item (h) (provision for price adjustment)**, the increase of $18.8 million is the provision for price adjustment for DCS Phase IIIC works.

Enclosure 6 to PWSC(2015-16)62

45CG – District Cooling System at the Kai Tak development

Estimated recurrent costs (in MOD prices)

Year	Estimated recurrent costs* $ million
2016-2017	65.2
2017-2018	68.7
2018-2019	72.6
2019-2020	56.1

* As provided in the District Cooling Services Ordinance, charges and fees received for the provision of district cooling services may be used to settle the operation and maintenance fees for the DCS operator as well as utility costs for operating the DCS plants. Therefore, the estimated recurrent cost shown in the table above is the shortfall of operating expenses incurred after deducting the charges and fees received for the provision of district cooling services of that particular year. While the price adjustment factor adopted for converting charges/fees received from 2016 to 2020 is based on the assumption of 4.5% increase per annum, that adopted for operating expenses incurred in September 2015 prices to MOD prices for the same period is based on the assumption of 6% increase per annum. It is estimated that starting from 2020-2021, the charges and fees received would be sufficient to settle all the operation and maintenance fees for the DCS operator as well as utility costs for operating the DCS plants.