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Panel on Development

Meeting on 28 November 2017

Updated background brief on the supply of Dongjiang water

Purpose

This paper provides background information on the supply of Dongjiang ("DJ") water. It also summarizes the views and concerns expressed by Members on the subject at the meetings of the Legislative Council and its committees since the 2014-2015 legislative session.

Supply of Dongjiang water

2. At present, about 20% to 30% of Hong Kong's fresh water supply is collected from rainfall and the remaining 70% to 80% is imported from DJ to make up the shortfall. The long-term supply of DJ water is secured under the "Agreement for the supply of Dongjiang water to Hong Kong" ("the Supply Agreement") entered between the Hong Kong Special Administrative Region Government and the Guangdong ("GD") Provincial Government, which is subject to periodic review of water prices and supply quantities. Prior to 2006, the Supply Agreements were based on a unit water price and annual supply quantities agreed with the GD side. From 2006 onwards, the Supply Agreements have adopted a package deal lump sum approach, under which an annual lump sum payment is made to the GD side for supply of an annual agreed quantity of DJ water to meet the needs of Hong Kong. The current Supply Agreement covers the period from 2015 to 2017.

Arrangements for the supply of Dongjiang water to Hong Kong between 2015 and 2017

3. The Administration briefed the Panel on Development ("DEV Panel") in October 2014 on the proposed arrangements for the supply of DJ water to Hong Kong between 2015 and 2017 and its financial implications.

4. To ensure 99% reliability in water supply to Hong Kong,¹ the Administration estimated that an annual quantity of 820 million cubic metres ("mcm") would be required in the period from 2015 to 2017. Taking into account the changes in Renminbi and Hong Kong dollar exchange rate, as well as the relevant price indices of GD and Hong Kong, the two sides agreed that the water purchase cost for the years of 2015, 2016 and 2017 would be increased at the rates of 6.65%, 6.36% and 6.38% respectively. Hence, as compared with the annual sum of water purchase cost of \$3,959.34 million for 2014, the annual sum of water purchase cost for 2015, 2016 and 2017 was adjusted to \$4,222.79 million, \$4,491.52 million and \$4,778.29 million respectively.² The current Supply Agreement covering the period between 2015 and 2017 was officially signed on 28 May 2015.³

Visit of the Panel on Development to the Dongjiang River Basin in April 2017

5. A delegation of DEV Panel conducted a duty visit to DJ River Basin from 14 to 15 April 2017 to better understand the operation of the DJ-Shenzhen Water Supply System (i.e. the system supplying water to Hong Kong) and measures taken by the GD Provincial authorities in safeguarding the quality of DJ water supplied to Hong Kong.⁴

Major views and concerns expressed by Members

6. In addition to expressing views on issues related to DJ water at meetings of DEV Panel and during the aforesaid duty visit, Members raised

¹ "99%" reliability means that water supply is maintained round-the-clock even under extreme drought condition with a return period of one in 100 years. "Return period" is the average number of years during which an event will occur once statistically. A longer return period means a rarer chance of occurrence. (Source: [LC Paper No. CB\(1\)89/14-15\(07\)](#))

² Source: [LC Paper No. CB\(1\)89/14-15\(07\)](#)

³ Source: [The Government's press release issued on 28 May 2015](#)

⁴ Report on the duty visit: [LC Paper No. CB\(1\)1209/16-17](#)

questions on the subject at meetings of the Legislative Council, the Finance Committee and the Public Works Subcommittee. The major views expressed by Members on the subject are summarized in the ensuing paragraphs.

Quantity of supply

7. Under the current Supply Agreement and the "Water Resources Distribution Plan in the Dongjiang River Basin of Guangdong Province" ("Distribution Plan") promulgated by the GD Provincial authorities setting out the maximum amount of water which cities in GD and Hong Kong may draw from DJ, the annual DJ water supply ceiling to Hong Kong is set at 820 mcm for the three years from 2015 to 2017, while the GD side maintains an ultimate annual supply quantity of 1 100 mcm, which, according to the Administration, will be adequate to meet the actual needs of Hong Kong beyond 2032.

8. In view of the increase in the price of DJ water and fresh water scarcity facing cities in GD, some Members urged the Administration to reduce the quantity of water to be purchased from DJ and prepare for greater water self-sufficiency. In the short-to-medium term, the Administration should promote the use of recycled wastewater, increase local reservoir storage capacity, expand the areas using non-edible water for toilet flushing, and explore new water sources, such as seawater desalination and water reclamation. In the long run, Hong Kong should develop towards a "sponge city", establishing a rainwater management system that covered the whole territory and using underground rainwater collection system and stormwater storage space to create an "underground sponge", so as to absorb, purify and store water during rainy days and draw the water stored for use when necessary. Some Members also asked if the Administration would formulate a water supply strategy setting out the respective proportions of fresh water to be produced from various sources.

9. The Administration advised that it had been exploring water resources other than DJ water for Hong Kong, including the proposed development of a seawater desalination plant at Tseung Kwan O and the proposed conversion of the tertiary treated sewage effluent from the Shek Wu Hui Sewage Treatment Works into reclaimed water for toilet flushing and other non-potable uses. It was however an unrealistic goal for Hong Kong to achieve water self-sufficiency given that DJ water currently provided about 70% to 80% of Hong Kong's fresh water supply. According to the Administration, if all the proposed measures to develop new water sources were implemented, up to 10% of the water supply in Hong Kong would come from desalination, 25% from reclaimed water, grey water and seawater (used for flushing), 50% or so from DJ water, with the remaining being local catchment water.

Package deal lump sum approach and quantity-based charging approach

10. There was a concern that while the Hong Kong side had made full payment for 820 mcm of DJ water per annum since 2006 under the package deal lump sum approach, the water drawn in recent years fell short of such supply quantity.⁵ In this connection, some delegation members enquired during the duty visit to DJ River Basin whether the GD side could supply DJ water to Hong Kong on a quantity-based charging approach. Some delegation members suggested adopting a two-portion payment method, i.e. one portion to be paid on the actual amount of water drawn and the other portion being a lump sum payment as a premium for "insurance", so as to ensure that water could be drawn up to the ceiling as and when necessary.

11. The GD Provincial authorities advised that the water resources development and utilization rate in DJ River Basin had reached 28.6%, which was close to the "safety red line" (33%). Therefore, the authorities had implemented the Distribution Plan to ensure an efficient usage of limited water resources. In determining the annual water quantity distribution plan, the GD Provincial authorities had to pre-determine the maximum quantity of water required by various areas (including Hong Kong) per year. The GD Provincial authorities considered that a quantity-based charging approach using the pre-determined maximum amount of water drawn per year was basically the same as the existing package deal lump sum approach. If the Hong Kong side did not determine the maximum amount of water drawn per year and adopted the quantity-based charging approach, while hoping to have guaranteed water supply, the GD side had to assess the unit price of water supplied to Hong Kong. The eventual water price to be paid by the Hong Kong side per year might not necessarily be lower than the current water price.

12. Officials from the Development Bureau added that the annual amount of DJ water imported to Hong Kong usually exceeded 700 mcm, and the imported amount reached 818 mcm in 2011, which was close to the water supply ceiling of 820 mcm. Therefore, pre-determining 820 mcm of water was to take out insurance for more than 100 mcm of additional water supply, so as to prevent Hong Kong from water rationing due to water shortage during extreme drought years. If the guaranteed water supply of 820 mcm was abandoned, the quota of DJ water given up by Hong Kong would be transferred to other cities along DJ that were in need of additional water resources.

⁵ For instance, 629 mcm of DJ water was imported to Hong Kong in 2016.

Price of Dongjiang water

13. During the aforesaid duty visit, some delegation members enquired about the reasons for the higher price of DJ water supplied to Hong Kong (e.g. about \$5.8 per cubic metre in 2017) compared to the prices of DJ water supplied to other GD cities, which were around \$1 per cubic metre.

14. The GD Provincial authorities explained that the supply of water to GD cities by the Water Resources Department was a kind of public service and the water price paid by GD cities did not fully reflect the real value of water resources. Apart from paying water tariffs, these cities also needed to spend much on the protection of water resources. Moreover, these cities devoted their precious land resources for the construction of the DJ-Shenzhen Water Supply System, while such land values had not been fully reflected in the cost of water supplied to Hong Kong. Hence, the water prices paid by GD cities were notionally lower than that paid by Hong Kong, but the actual costs paid for water by these cities were far higher than that paid by Hong Kong.

15. As regards Members' enquiries about the unit cost of drinking water produced from various sources, the Administration advised that the unit cost was \$4.3, \$9.5 and \$12-\$13 per cubic metre for drinking water produced from local catchment, DJ water⁶ and desalination respectively in the 2015-2016 financial year.

Quality of Dongjiang water

16. Some Members expressed concern on the arrangements of the Shenzhen authorities to discharge floodwater from the polluted Shawan River to the Shenzhen Reservoir during rainstorms by opening the flood gates at the Shawan Interception Point as the arrangements might contaminate DJ water supplied to Hong Kong.⁷

⁶ Apart from the purchase cost, the production of drinking water from DJ water involves other costs, such as treatment, distribution and customer service.

⁷ DJ water supplied to Hong Kong is extracted from Taiyuan Pumping Station in Dongguan and discharged into the Shenzhen Reservoir through a dedicated aqueduct. The water is then conveyed through pipelines to Muk Wu Pumping Station in Hong Kong. After the completion of the Shawan River sewage interception works in 2003, the polluted Shawan River does not flow into the Shenzhen Reservoir normally. However, the Shenzhen authorities may need to discharge floodwater from the Shawan River to the Shenzhen Reservoir during rainstorms for the sake of public safety.

17. The Administration explained that the water quality monitoring data of the Water Supplies Department ("WSD") indicated that DJ water supplied to Hong Kong was of consistently good quality and the average values of various monitoring parameters were in full compliance with the water quality requirements under the Supply Agreement, i.e. Type II waters in the Environmental Quality Standards for Surface Water (GB 3838-2002).⁸ However, certain water quality indicators might occasionally deviate from the stipulated values for Type II waters under exceptional circumstances, such as the said floodwater discharge at the Shawan Interception Point.

18. The Administration further advised that a notification mechanism had been put in place by the GD and Hong Kong sides to ensure that WSD in Hong Kong would receive early alert about the said floodwater discharge from the GD side and take appropriate measures, such as stepping up the water quality monitoring work and suspending the import of DJ water when necessary. The Shenzhen authorities had also launched a comprehensive remediation project to improve the water environment of the Shawan River Basin and protect the water quality of Shenzhen Reservoir. The project was expected to be completed by 2019.

Latest development

19. The current Supply Agreement is due to expire at the end of 2017. At the meeting of DEV Panel to be held on 28 November 2017, the Administration will brief the Panel on the new Supply Agreement covering the period from 2018 to 2020.

Relevant papers

20. A list of relevant papers with their hyperlinks is in the **Appendix**.

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Legislative Council Secretariat
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⁸ According to the Administration ([LC Paper No. CB\(1\)89/14-15\(07\)](#)), there are five types of surface water standards designated for specific functions and purposes of protection. Type I standard is mainly applicable to source water and national nature reserve, and is not for abstraction for human consumption. Type II standard is mainly applicable to first class protection area for the abstraction for human consumption. DJ water supplied to Hong Kong applies Type II standard, which is the highest standard.

Supply of Dongjiang water

List of relevant papers

Council/Committee	Date of meeting	Paper
Panel on Development	28 October 2014	Administration's paper on "Supply of Dongjiang Water" [LC Paper No. CB(1)89/14-15(07)] Minutes of meeting [LC Paper No. CB(1)347/14-15]
Council meeting	12 November 2014	Hansard — oral question (No. 4) on "Water Supply for Hong Kong" (p. 1899-1911)
Panel on Development	24 March 2015	Administration's paper on "357WF — Design and Construction for First Stage of Desalination Plant at Tseung Kwan O — Investigation Study Review, Design and Site Investigation" [LC Paper No. CB(1)650/14-15(05)] Minutes of meeting [LC Paper No. CB(1)985/14-15]
Finance Committee special meeting	1 April 2015	Report on the Examination of the Estimates of Expenditure 2015-2016 (Paragraphs 15.23-15.30 of Chapter XV)
Public Works Subcommittee	9 June 2015	Administration's paper on "Head 709 — Waterworks 357WF — Design and Construction for First Stage of Desalination Plant at Tseung Kwan O" [LC Paper No. PWSC(2015-16)18] Minutes of meeting [LC Paper No. PWSC245/14-15]

Council/Committee	Date of meeting	Paper
Finance Committee	26 June 2015	Administration's paper on "Recommendations of the Public Works Subcommittee made on 3 and 9 June 2015" [LC Paper No. FCR(2015-16)14] Minutes of meeting at 3:01 pm [LC Paper No. FC70/15-16]
Council meeting	6 January 2016	Hansard — oral question (No. 4) on "Perfluorinated Chemicals in Drinking Water and Environment as well as Quality of Dongjiang Water" (p. 3351-3362)
Finance Committee special meeting	7 April 2016	Report on the Examination of the Estimates of Expenditure 2016-2017 (Paragraphs 16.23-16.31 of Chapter XVI)
Council meeting	29 June 2016	Hansard — oral question (No. 1) on "Quality of Dongjiang Water" (p. 12725-12735)
Council meeting	14 December 2016	Hansard — written question (No. 18) on "Water Resources Management and Drinking Water Safety" (p. 2507-2517)
Finance Committee special meeting	31 March 2017	Report on the Examination of the Estimates of Expenditure 2017-2018 (Paragraphs 4.15-4.22 of Chapter IV)
Council meeting	10 May 2017	Hansard — written question (No. 10) on "Management of and Tapping for Fresh Water Resources" (p. 6967-6972)
Council meeting	7 June 2017	Hansard — written question (No. 8) on "Management of Water Resources" (p. 9157-9161)

Council/Committee	Date of meeting	Paper
House Committee	30 June 2017	Report on the Duty Visit to the Dongjiang River Basin [LC Paper No. CB(1)1209/16-17]