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Panel on Development

Meeting on 13 December 2023

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 ("LegCo") and its committees.

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.[1] The long-term supply of DJ water is secured under the "Agreement for the supply of Dongjiang water to Hong Kong" ("Supply Agreement") entered between the Hong Kong Special Administrative Region Government ("HKSARG") and the Guangdong ("GD") Provincial Government, which is subject to periodic review of water prices and supply quantities.

Arrangements for the supply of Dongjiang water to Hong Kong before 2021

3. Prior to 2006, the Supply Agreements were based on a unit water price and annual supply quantities agreed with the GD side. From 2006 to 2020, 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

[1] As early as in 1960, the Hong Kong Government was well aware that the increasing fresh water demand in Hong Kong could no longer be satisfied by local yield solely, and the procurement of fresh water from Guangdong Province was the most efficient way for fulfilling the unmet water needs. Since 1965, Hong Kong has been importing DJ water to meet local water demand.

annual agreed quantity of DJ water to meet the needs of Hong Kong. According to the Administration, on the one hand, the approach enables Hong Kong to import DJ water as needed each year up to an annual supply ceiling specified in the Supply Agreements, while on the other hand, it avoids wastage of DJ water resources and saves the pumping costs when more local yield is available in a particular year.

4. As the "package deal lump sum" approach has been adopted for more than 10 years since its first application in 2006 and the approach contains a fixed annual lump sum water price irrespective of the actual quantity of DJ water supplied in that year, there have been public requests for adoption of an alternative "payment on actual supply quantity" approach. In this connection, HKSARG set up a working group with the GD side in 2017 to review the payment approach.

Arrangements for the supply of Dongjiang water to Hong Kong between 2021 and 2023

5. Signed on 28 December 2020, the Supply Agreement between 2021 and 2023 includes the following major features:

(a) an annual supply ceiling of 820 million cubic metres ("mcm") of DJ water is retained to meet the actual needs of Hong Kong with 99% reliability[2] in water supply to Hong Kong;[3]

(b) while the water prices in this Supply Agreement increase by 1.33% annually,[4] the actual water price for 2021 is frozen at the 2020 level, which is a special arrangement of the GD side to ease the financial burden of Hong Kong arising from the COVID-19 epidemic. The annual lump sum/ceiling water prices since 2015 are summarized in **Appendix 1**;

(c) to address the public requests for payment based on the quantity of DJ water supplied, the previously adopted "package deal lump sum" approach is enhanced to a "package deal deductible sum" approach

[2] "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.

[3] The ultimate annual DJ water supply quantity of 1 100 mcm is maintained to cater for unforeseen situation.

[4] The adjustment of DJ water price is based on changes in operation costs, exchange rate between Renminbi and Hong Kong Dollar as well as the relevant price indices of both sides.

with a water price deduction mechanism introduced in this Supply Agreement. Under the mechanism, the annual water price will be adjusted downward from the fixed annual ceiling water price by deducting the difference between the annual supply ceiling and the actual amount of water supplied multiplied by a unit rate.[5] According to the Administration, under the "package deal deductible sum" approach which should be maintained at least up to 2029, the actual water price to be paid should be lower than that under the previous "package deal lump sum" approach. The maximum saving, based on the 2021 price level, is $324 million within the nine-year period (i.e. 2021 - 2029); and

(d) assurance from the GD side to maintain the quality of DJ water supplied to Hong Kong in compliance with Type II waters in the Environmental Quality Standards for Surface Water (GB3838-2002), which is the highest national standard for surface water applicable for the abstraction for human consumption.

Major views and concerns expressed by Members

6. Members expressed views on the supply of DJ water at meetings of LegCo, the Finance Committee ("FC") and the Panel on Development ("DEV Panel"), as well as during a duty visit of the DEV Panel to DJ River Basin in April 2017. Their major views and concerns are summarized in the ensuing paragraphs.

Diversifying water sources

7. 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" through 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

[5] Details of the "package deal deductible sum" approach and water price deduction mechanism are set out in paragraphs 2(c) and 6 to 17 of LC Paper No. CB(1)370-20-21(01).

asked if the Administration would formulate a water supply strategy setting out the respective proportions of fresh water to be produced from various sources. There was a view that the Administration should step up efforts in promoting water conservation and reducing water leakage.

8. The Administration advised that it had been exploring water resources other than DJ water for Hong Kong, including the development of a seawater desalination plant at Tseung Kwan O[6] and the 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.[7] 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

9. 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. During the duty visit of the DEV Panel to DJ River Basin, some delegation members enquired whether the GD side could supply DJ water to Hong Kong based on a "quantity-based charging" approach or 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. A similar view was also expressed by Members on other occasions, calling on the Administration to adopt a mixed payment mode, under which a lower annual supply ceiling at, say, 700 mcm with a lower lump sum water price should be fixed, and any quantity of water drawn exceeding this ceiling should be charged on a "payment on actual supply quantity" basis.

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[6] A relevant item PWSC(2019-20)2—"357WF—Design and construction for first stage of desalination plant at Tseung Kwan O" was endorsed by the Public Works Subcommittee ("PWSC") on 14 May 2019 and approved by FC on 1 November 2019.

[7] A relevant item in enclosure 5 to PWSC(2018-19)41—"388DS—Shek Wu Hui Effluent Polishing Plant" was endorsed by PWSC on 20 March 2019 and approved by FC on 3 May 2019.

10. The Administration advised that the annual amount of DJ water imported to Hong Kong usually exceeded 700 mcm. For example, the imported amount reached 802 mcm in 2020, 811 mcm in 2021 and 810 mcm in 2022, 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. That said, the working group established by HKSARG and the GD side eventually agreed that the "package deal lump sum" approach should continue to be adopted largely with an adjustable element of water price deduction according to the actual amount of DJ water supplied, and such adjustment element has been introduced in the Supply Agreement between 2021 and 2023.

Price of Dongjiang water

11. During the duty visit of the DEV Panel to DJ River Basin in April 2017, 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.

12. 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 (i.e. the system supplying water to Hong Kong), 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.

13. Some Members noted that changes in operation costs were one of the three factors taken into account in the adjustment of DJ water price, and asked about the details of the operation costs, such as the actual electricity costs, incurred on the GD side for supplying water to Hong Kong.

14. The Administration advised that it had not acquired information on the operation costs from the GD side. Nevertheless, the possible reduction of electricity costs in the past years had been taken into account in considering the

reasonableness of the increase in DJ water price. The Administration indicated that the GD authorities had in recent years taken forward various initiatives to improve the hardware of the DJ water supply system to ensure the water quality, but the water price had not reflected the costs incurred.

Quality of Dongjiang water

15. 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.[8]

16. 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). 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.

17. 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.

Council questions

18. Questions relating to the supply of DJ water were raised at the Council meetings between June 2018 and June 2023. The hyperlinks to the questions and the Administration's replies are provided in **Appendix 2**.

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[8] 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.

Latest development

19. At the DEV Panel meeting to be held on 13 December 2023, the Administration will brief the Panel on the new Supply Agreement between 2024 and 2026.

Relevant papers

20. A list of relevant papers on the LegCo website is in **Appendix 2**.

Council Business Division 1 and Public Complaints Office
Legislative Council Secretariat
12 December 2023

Appendix 1

Annual lump sum/ceiling water prices under the Agreements for the supply of Dongjiang water to Hong Kong since 2015

Year	Annual lump sum/ceiling water prices (HK$ million)	Annual increase
2015	4,222.79	6.65%
2016	4,491.52	6.36%
2017	4,778.29	6.38%
2018	4,792.59	0.30%
2019	4,807.00	0.30%
2020	4,821.41	0.30%
2021	4,885.53 [Note]	1.33%
2022	4,950.51	1.33%
2023	5,016.35	1.33%

Note: The actual water price for 2021 was frozen at the 2020 level (i.e. HK$4,821.41 million) to ease the financial burden of Hong Kong arising from the COVID-19 epidemic.

Sources: LC Paper Nos. CB(1)89/14-15(07), CB(1)235/17-18(05) and CB(1)370/20-21(01)

Appendix 2

Supply of Dongjiang water

List of relevant papers

Committee	Date of meeting	Paper
House Committee	30 June 2017	Report of the delegation of the Panel on Development on the Duty Visit to the Dongjiang River Basin
Panel on Development	28 November 2017	Agenda item V: Supply of Dongjiang Water Minutes of meeting Follow-up paper
Finance Committee	19 April 2018	Administration's replies to Members' initial written questions on the Estimates of Expenditure 2018-2019 (Reply Serial Nos. DEVB(W)025, 112, 118, 164, 165, 167 and 171)
Finance Committee	11 April 2019	Report on the examination of the Estimates of Expenditure 2019-2020 (Paragraphs 18.21-18.23 of Chapter XVIII)
Finance Committee	8 April 2020	Administration's replies to Members' initial written questions on the Estimates of Expenditure 2020-2021 (Reply Serial Nos. DEVB(W)069, 070, 075, 146, 147 and 158)
Panel on Development	21 December 2020*	Administration's information paper on "Supply of Dongjiang Water"
Finance Committee	15 April 2021	Administration's replies to Members' initial written questions on the Estimates of Expenditure 2021-2022 (Reply Serial No. DEVB(W)078)
Finance Committee	13 April 2023	Administration's replies to Members' initial written questions on the Estimates of Expenditure 2023-2024 (Reply Serial No. DEVB(W)036)

* Issue date

Council Meeting	Paper
20 June 2018	Question No. 14: Water Supply Arrangements and Management of Water Resources
27 June 2018	Question No. 10: Fresh Water Supply in Hong Kong in Times of Droughts in Guangdong Province
26 June 2019	Question No. 8: Supply of Water to Hong Kong
15 June 2022	Question No. 18: Management of Water Resources
28 June 2023	Question No. 22: Making Good Use of Reservoirs for Leisure Purpose