Development

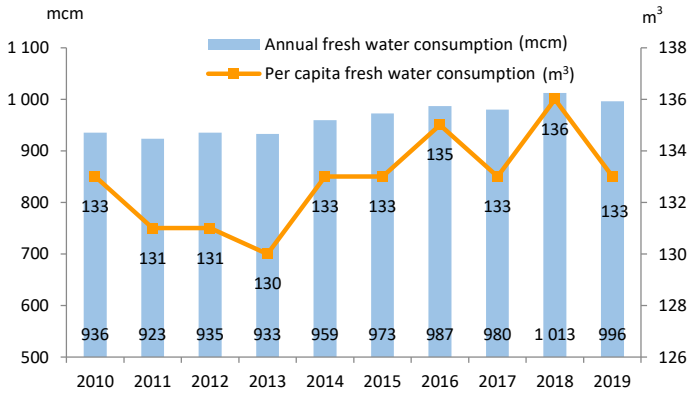
Statistical Highlights

Research Office
Legislative Council Secretariat

ISSH19/20-21

Dongjiang water supply

Figure 1 – Annual fresh water consumption[(1)]



Note: (1) Fresh water consumption also includes water loss in water treatment and leakage due to water mains burst. Such loss and leakage amounts to about a third of the total water consumption.

Figure 2 – Sources of fresh water supply

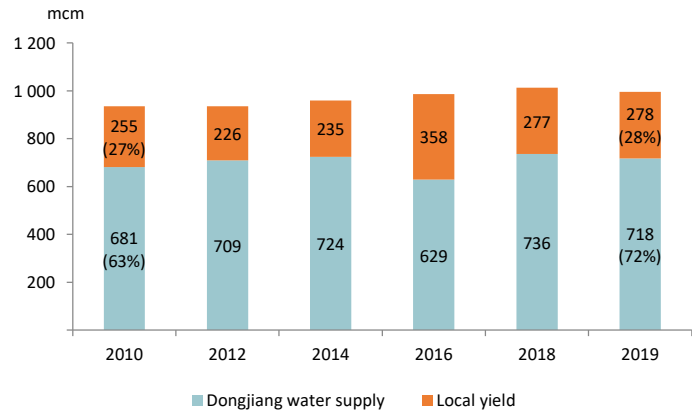
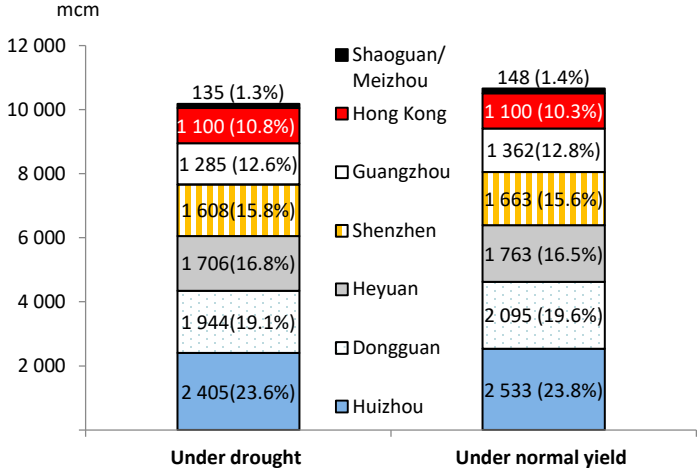


Figure 3 – Dongjiang Water Resources Distribution Plan



Highlights

- Hong Kong's fresh water consumption have risen over the past decade due to an increase in population and economic activities. In 2019, the city used 996 million cubic metres ("mcm") of fresh water, which was 6.4% higher than that of 2010. Each water user in Hong Kong on average consumed 133 cubic metres ("m^3") of fresh water in 2019 (**Figure 1**).

- Without adequate fresh water resources in the territory, Hong Kong has been relying on water imported from Dongjiang River ("Dongjiang") in Guangdong since 1965 after the city was hit by serious droughts. By now, Dongjiang water supply roughly meets at least 70% of Hong Kong's fresh water needs, with the remaining 30% satisfied by less stable local yield from harvesting rainfall (**Figure 2**). In recent years, the Government has also tried to further increase and diversify supply by developing water desalination and reclaimed water. The former is expected to provide about 5% of fresh water consumption, whereas the latter is mainly used for certain applications like cleaning of roads and vehicles in order to reduce the fresh water demand.

- Dongjiang is a major source of water for 40 million people in Guangdong. To better coordinate the use of Dongjiang water resources among various cities in Guangdong, the Guangdong government has introduced the Water Resources Distribution Plan in the Dongjiang River Basin since 2008, specifying the maximum water quantity allocated to eight cities annually. Under this plan, Hong Kong can maintain a long term supply of up to 1 100 mcm, or up to 10.8% of the available water resource even when Dongjiang is affected by drought. Other cities, however, are allocated less water during droughts (**Figure 3**).

- The Government has indicated that, to diversify water supply in Guangdong, a project is being implemented by the Guangdong authorities to divert water from the Xijiang River (which has bigger flow than Dongjiang River) in the western Pearl River Delta to the eastern Delta region cities including Guangzhou Nansha, Dongguan and Shenzhen. When completed, the project is expected to enhance the back-up water supply to Hong Kong.

Figure 4 – The Dongshen water supply system in 2019

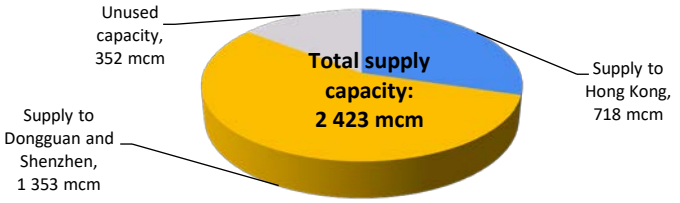


Figure 5 – Actual supply quantities, total water prices (HK$ mln) and supply not taken (mcm)

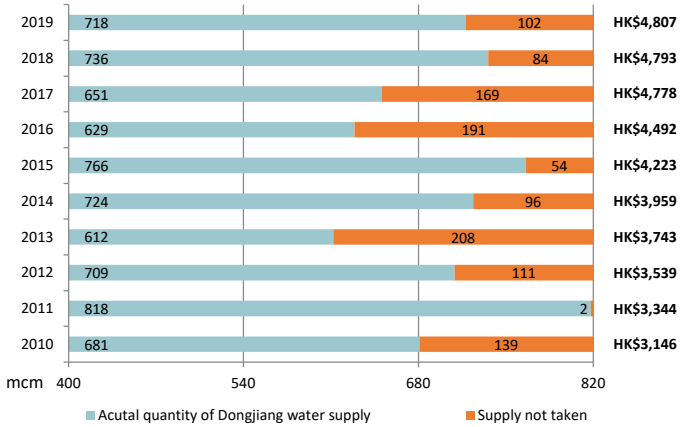


Figure 6 – Average and effective unit costs of Dongjiang water

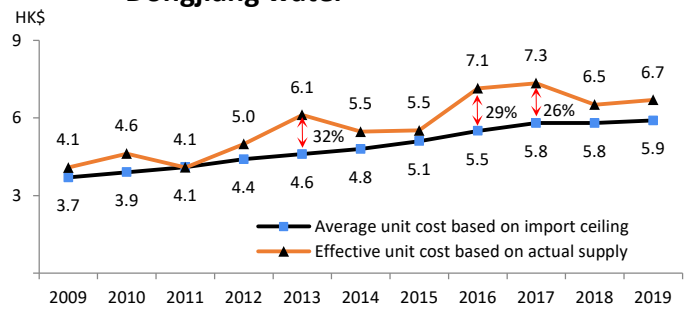


Figure 7 – Estimated water price (HK$ mln) and unit costs under different import scenarios in 2021

Import of 615 mcm (205 mcm below ceiling)	Import of 700 mcm (120 mcm below ceiling)	Import of 820 mcm (Ceiling)
Water price: **HK$4,824.03** *i.e. HK$4,885.53 less HK$61.5 (Discount : HK$0.3x205 mcm)*	Water price: **HK$4,849.53** *i.e. HK$4,885.53 less HK$36 (Discount: HK$0.3x120 mcm)*	Water price: **HK$4,885.53** *(No discount)*
Unit cost: HK$7.84	**Unit cost: HK$6.93**	**Unit cost: HK$5.96**

Note: The discount for 2021 is set at HK$0.3 per m^3.

Highlights

- Dongjiang water is channeled to Hong Kong, Dongguan and Shenzhen via the Dongshen Water Supply System consisting of pumping stations and aqueducts, in operation since the 1960s with subsequent expansion and refinements. With a capacity to channel up to 2 423 mcm of water a year, the system sent the three places a total of 2 071 mcm of water in 2019, of which 718 mcm or 35% was to Hong Kong. There was still 352 mcm or 15% unused capacity (**Figure 4**).

- The Dongjiang water supply used to be governed by a fixed-term "package deal lump sum" agreement, setting out the annual supply ceiling and price. Under the deal, Hong Kong paid an annual sum for a guarantee supply of up to an agreed ceiling of 820 mcm. Despite the ceiling, Hong Kong has never reached that between 2010 and 2019, with untaken supply as little as 2 mcm in 2011 and as much as 208 mcm in 2013. Yet, the annual total payment has continued to rise due to cost hikes, inflation and exchange rate changes (**Figure 5**). This has led to concern over high effective unit cost paid, especially when less water was actually taken (**Figure 6**).

- In late 2020, the Government entered a new water supply agreement with the Guandgong authorities, adopting the "package deal deductible sum" approach. The deal has (a) set the annual water prices for the next three years (e.g. HK$4,886 million for 2021) at the same annual supply ceiling; and (b) offered an annual discount rate of HK$0.3, HK$0.304, HK$0.308 per m^3 in 2021, 2022 and 2023 respectively on any untaken amount, to be deductible from the annual water price. Yet, Hong Kong is obliged under the deal to take an annual minimum of 615 mcm water, and at least an annual average of 700 mcm (which is roughly the level of average water intake from 2010 to 2019) during the nine-year period starting from 2021. The deal is expected to deliver a total saving of HK$324 million throughout the nine-year period. Based on the new approach, the effective unit water cost will fall between HK$5.96 per m^3 and HK$7.84 per m^3 in 2021 (**Figure 7**).

Data sources: Latest figures from Development Bureau, Water Supplies Department, Legislative Council papers, and Guangdong Investment Limited.

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