



供水管理

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### 全面水資源管理

於二零零八年發佈的「全面水資源管理策略」為我們持續使用珍貴的水資源提供堅實基礎。此策略強調控制用水需求增長及加強供水，以令香港能更好地應對未來的不明朗因素及挑戰。本署一直多管齊下，採取「軟硬兼備」的策略，向住宅用戶及非住宅用戶推廣節約用水。除抑制用水需求增長外，我們亦已完成為期15年、長達3,000公里的老化水管更換及修復計劃，大幅減少水管滲漏情況，並逐步建立「智管網」，持續監測供水網絡狀況，以便及時採取適當和具成本效益的行動，讓我們成功開創管網管理新紀元。

### Total Water Management

The Total Water Management strategy promulgated in 2008 provides a firm foundation for us to move toward sustainable use of our precious water resources. This strategy places emphasis on containing the growth of water demand and strengthening supply to better prepare Hong Kong for future uncertainties and challenges. Our Department has been adopting a multi-pronged approach to promote water conservation in both domestic and non-domestic sectors, applying hardware as well as software strategies. On the other front of containing water demand growth, we have achieved a significant reduction in water main leakage following the completion of a 15-year programme of replacement and rehabilitation for 3,000 kilometres of aged water mains, and are progressively establishing the Water Intelligent Network (WIN) to continuously monitor the health of water supply networks in order to respond with timely and cost effective actions, bringing the network management into a new era.

## 策略回顧

本署深知水資源所面臨的挑戰。為了確保依循正確的方向進發，本署於二零一四年底聘請顧問，對全面水資源管理策略進行全面檢討。這次檢討旨在借鑒海外相關經驗、評估現有水資源管理措施的成效、預測直至二零四零年的水資源需求及供應情況、尋求新的水資源管理措施，以及在有需要時適當調整現行措施，以加強本署的應變能力，讓本署作好更充足的準備，以應對因氣候變化、快速的人口和經濟增長，以及廣東省多個城市對東江水的競爭加劇而帶來的不明朗因素及挑戰。

## 六管齊下的供水結構

目前，香港供水系統有三個分支，包括本地集水區收集的雨水、從廣東輸入的東江水及沖廁用海水。二零一六年的總耗水量（包括沖廁用水需求）為12.47億立方米，其分項為29%雨水、50%東江水及21%海水。憑藉這三個水源，香港多年來一直擁有可靠的供水。

然而，為使香港能充分應對上述各種挑戰，本署致力透過用水流失管理及節約用水控制用水需求增長，並探索受氣候影響較少的海水化淡及再造水作為可替代水源。隨著該等措施的推行，本署正致力建設六個分支的供水結構，該結構由現有三個來源—本地集水、輸入的東江水及沖廁用海水，以及三個新增來源，（即淡化海水、再造水和重用中水及回收雨水）構成。這六個供水來源將成為提升香港供水保障及適應性的重要支柱。

## Strategy Review

The Department fully recognises the challenges faced by our water resources. In order to ensure moving forward on the right track, we appointed consultants in late 2014 to conduct a comprehensive review of the Total Water Management Strategy. The review aims to make reference to relevant experience overseas, evaluate the effectiveness of existing water management measures, forecast water demand and supply up to 2040, seeking for new water management initiatives and adjustments to the existing measures if necessary to strengthen our resilience and preparedness against uncertainties and challenges arising from climate change, rapid population and economic growth, as well as heightened competition for Dongjiang water among cities in Guangdong Province.

## 6-Pronged Water Supply Structure

Currently, Hong Kong has a 3-pronged water supply system, comprising rainwater from local catchments, imported water from Dongjiang in the Guangdong Province, and the use of sea water for toilet flushing. The share breakdown of total water consumption in 2016 (including flushing water demand) was 1,247 million cubic metres, comprising 29% rainwater, 50% imports from Dongjiang, and 21% from sea water. These three water sources have provided Hong Kong with a reliable water supply over the decades.

Nevertheless, to better prepare Hong Kong for the aforementioned challenges, we have been striving to contain water demand growth through water loss management and water conservation and by exploiting alternative water resources which are less susceptible to climate change, including sea water desalination and water reclamation. With the implementation of these measures, WSD is moving towards the establishment of a 6-pronged water supply structure, comprising the existing three sources – local yield, imported Dongjiang water and sea water for flushing, supplemented by three new sources, i.e. desalinated water, reclaimed water, plus recycled grey water and harvested rainwater. These six water supply sources will become the pillars supporting Hong Kong with enhanced water security and adaptation into the future.



## 東江水

東江水佔目前本港食水供應量約七成至八成，能夠彌補本地集水量的不足以應付本港的食水需求。因此，可靠和穩定的東江水供應對本港非常重要。

自二零零六年起的東江水供水協議均採用「統包總額」方式，使香港有可靠和靈活的東江水供應以應付實際需求；並確保供水的可靠性達99%，即縱使在百年一遇的極旱情況下，仍能維持全日供水。採用這個方式，我們一方面可按需要輸入東江水至供水協議所訂明每年8.2億立方米的供水量上限；另一方面亦可在本地集水足夠時，避免浪費東江水資源以及節省抽水成本。根據現行為期三年的供水協議，二零一五年、二零一六年及二零一七年的東江水費用分別為42.23億港元、44.92億港元和47.78億港元。

## 本地集水

遍佈全港17個水塘的集水區佔香港面積近三成。一般而言，從集水區收集的雨水大多不受污染，然而，為確保食水安全，本署採取額外措施，包括進行定期巡查、檢查水質及對集水區進行必要維修和清除泥石等。本地雨水收集佔總食水用量約二至三成。

## Dongjiang Water

Dongjiang (DJ) water, which now provides about 70% to 80% of our fresh water supply, is able to fill the gap due to the insufficient local yield in meeting the water demand. A reliable and stable supply of DJ water is thus essential for Hong Kong.

Since 2006, the “package deal lump sum” approach has been adopted in the DJ Water Supply Agreements to ensure a reliable and flexible supply of DJ water to meet the actual needs of Hong Kong with 99% reliability, i.e. water supply is maintained around the clock even under extreme drought conditions with a return period of once in 100 years. This approach enables us to import DJ water as needed each year up to an annual supply ceiling of 820 million cubic metres specified in the supply agreements while it also avoids wastage of the DJ water resources and saves our pumping costs when more local yield is available in a particular year. The current 3-year agreement for the cost of water from Guangdong breaks down to: HK\$4,223 million, HK\$4,492 million and HK\$4,778 million for the years 2015, 2016 and 2017 respectively.

## Local Yield

All across Hong Kong, covering nearly 30% of the Territory, are catchment areas with 17 impounding reservoirs. In general, rainwater collected in catchment areas is uncontaminated. However, as additional measures for water safety, the Department makes regular inspections, checks water quality, carries out necessary maintenance and removes debris in the catchwaters. Local yield generally accounts for about 20% to 30% of our total fresh water consumption.

## 海水沖廁

除飲用水源外，本署同樣重視沖廁用的海水。薄扶林及新界西北（包括屯門東、元朗及天水圍）海水供應水務基礎設施完成後，沖廁用海水供水網絡覆蓋的人口已由八成上升至八成半。新界西北天水圍的海水沖廁轉換工作已於二零一六年底竣工，額外有30萬人口可利用海水沖廁。餘下地區的海水沖廁轉換工作正在逐步進行。

## 海水化淡

本署一直高度重視與供水管理有關的事宜，並致力探討所有可行方案尋找新的水資源。在這情況下，除了現有來自雨水、東江水和沖廁用海水的水資源外，我們還積極開發不會或不容易受氣候變化影響的新供水來源，包括海水化淡、再造水及中水重用及雨水回收。

氣候變化可能影響香港的供水穩健，為了發展不受氣候變化影響的新供水來源，我們應用先進的逆滲透技術，開始在將軍澳興建海水化淡廠。我們已完成擬建海水化淡廠第一階段的參考設計，並正準備為海水化淡廠的「設計—建造—運作」合約進行招標。我們將要求投標者建議合適的創新設計，在使用可再生能源、建築處理、環境影響和消耗較少能源的水處理過程各方面，令海水化淡廠能與未來周邊發展相協調，並與所在的自然棲息地和諧共存，以兌現水務署的使命宣言。

## Sea Water for Flushing

In addition to potable water sources, we also place great importance on the application of sea water for toilet flushing. Following completion of the waterworks infrastructure for the supply of sea water to Pok Fu Lam and North West New Territories (Tuen Mun East, Yuen Long and Tin Shui Wai), the population coverage of sea water for flushing has increased from 80% to 85%. In northwest New Territories, conversion of flushing supply to sea water in Tin Shui Wai was completed by end of 2016 with an additional 300,000 population served by sea water flushing. The conversion works in remaining areas are now underway.

## Sea Water Desalination

The Department always places great emphasis on issues concerning water supply management, and we have been working diligently to explore all viable options of new water resources. Given this scenario, apart from the existing water resources from rainwater, DJ water and sea water for flushing, we have been actively developing new sources of water supply that are not, or less susceptible to climate change, including sea water desalination, water reclamation, grey water recycling and rainwater harvesting.

In order to develop a new water source that is immune to climate change which could disrupt the security of our water supply in Hong Kong, we have embarked on the construction of a desalination plant in Tseung Kwan O (TKO), using advanced reverse osmosis technology. We completed a reference design of the first stage of the proposed desalination plant, and we are preparing to invite tenders for the DBO contract for the plant. We will require the tenderers to propose suitable innovative designs in terms of renewable energy usage, architectural treatment, environmental impacts, and water treatment processes that require less energy consumption, for blending the plant with future surrounding development coherently as well as harmoniously coexisting with its natural habitats to fulfill WSD's mission statement.

我們正準備就「設計－建造－運作」合約進行招標，以期於二零一八年年底展開化淡廠的建造工程。化淡廠的食水產量預期可滿足香港約百分之五的食水需求，日後產量可擴大至滿足本港約百分之十的食水需求。

## 再造水

本署亦計劃分階段向上水、粉嶺及古洞北和粉嶺北新發展地區提供石湖墟污水處理廠經三級處理排放水生產的再造水作非飲用用途，其中上水及粉嶺將於二零二二年起率先使用。本署已於二零一七年四月展開有關配水庫和輸水幹管的建造工程，預計向上述地區全面供應再造水最終可望每年節省約2,100萬立方米的食水。同時，本署正在制訂在香港供應再造水的適用財務及法律框架。

## 中水重用及雨水回收

從浴室、洗手盆和廚房洗滌盆等地方收集得來的水稱為中水。中水與回收雨水經處理後可予重用，作非飲用用途。

水務署將在安達臣道石礦場用地發展項目中興建中央中水重用系統。該系統由政府負責運作，處理在發展區內從居民收集的中水作以沖廁為主的用途。該系統將包括一所中水處理廠、抽水系統、一個貯存經處理中水的配水庫、以及收集中水和輸送經處理後的中水的管道。我們已聘任顧問為中水處理廠進行詳細設計，該廠的處理量為每日3,300立方米，而建造工程預計於二零一九年展開，並於二零二二年完成。

We are preparing for invitation of tenders for commencing construction of the plant by end 2018. The water production output is expected to meet about 5% of the fresh water demand in Hong Kong with provisions for expanding its capacity in the future to meet about 10% of the Territory's total fresh water demand.

## Water Reclamation

We also plan to effect the supply of reclaimed water converted from tertiary treated sewage effluent at Shek Wu Hui Sewage Treatment Works to Sheung Shui, Fanling and New Development Areas in Kwu Tung North and Fanling North for non-potable uses in phases starting with Sheung Shui and Fanling from 2022 onwards. We began the construction of a relevant service reservoir and trunk mains in April 2017 and anticipate that the full-fledged reclaimed water supply to the above areas will ultimately save up to 21 million cubic metres of fresh water each year. Concurrently, we are developing an appropriate finance and legal framework for the supply of reclaimed water in Hong Kong.

## Grey Water Recycling and Rainwater Harvesting

Water collected from baths, showers, wash basins and kitchen sinks is known as grey water. Along with harvested rainwater, these supplies can be treated and reused for non-potable purposes.

WSD will construct a centralized grey water recycling system at the Anderson Road Quarry Site Development, which is a government-operated system treating grey water collected from inhabitants within the development mainly for toilet flushing use. This system comprises a grey water treatment plant, a pumping system, a treated grey water service reservoir, and pipes for grey water collection and distribution of the treated grey water to the service reservoir and consumers respectively. We have engaged consultants to conduct the detailed design of the grey water treatment plant which will have a treatment capacity of 3,300 cubic metres per day, and the construction works are planned to commence in 2019 for completion in 2022.

本署一直在探索更廣泛地應用中水重用及雨水回收系統，以在合適的新政府項目中加以安裝。發展局和環境局發出的環保政府大樓聯合技術通告已納入詳細指引，讓新建政府大樓盡可能在合理的情況下安裝處理和再造設施，通過中水重用或雨水回收系統減少以食水作非飲用用途。

就私人樓宇而言，除了在二零一六年三月推出的綠建環評既有建築2.0版下，給予設有中水重用和雨水回收系統的樓宇額外得分外，我們正為香港綠色建築議會對綠建環評新建建築類似的檢討中提供技術支援，以鼓勵發展商提供設施減少非飲用用途的食水用量。

## 供水危機管理

為確保全港供水可靠及充足，本署須時刻作好準備應對任何影響供水的不可預見問題。為此，我們已制訂一個危機管理計劃、乾旱應變計劃和多個其他應變計劃，以隨時準備快速調配資源及協調各個緊急行動。

此外，本署已透過各種溝通渠道與其他政府部門保持緊密聯絡，以便在發生危機時，協調各方緊急應變措施以確保持續供水。

We have been exploring the wider use of grey water recycling and rainwater harvesting systems in suitable new government projects. Detailed guidelines have been incorporated into the Joint Development Bureau and Environment Bureau Technical Circular in Green Government Buildings so that new government buildings with the potential of reducing their fresh water demand for non-potable applications through rainwater harvesting or a grey water recycling system will be able to install on-site treatment and recycling facilities as much as is reasonably possible.

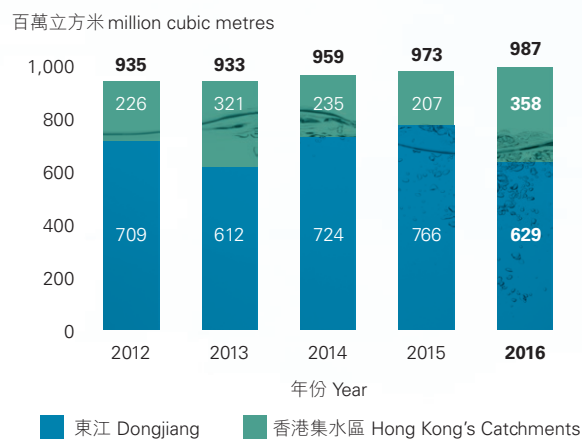
As far as private buildings are concerned, apart from bonus credits awarded to buildings with grey water reuse and rainwater harvesting systems under the Building Environmental Assessment Method (BEAM) Plus for Existing Buildings Version 2.0 launched in March 2016, we are providing technical support to Hong Kong Green Building Council in their similar review of BEAM Plus for New Buildings to encourage developers to provide these facilities in reducing the use of fresh water for non-potable uses.

## Water Supply Crisis Management

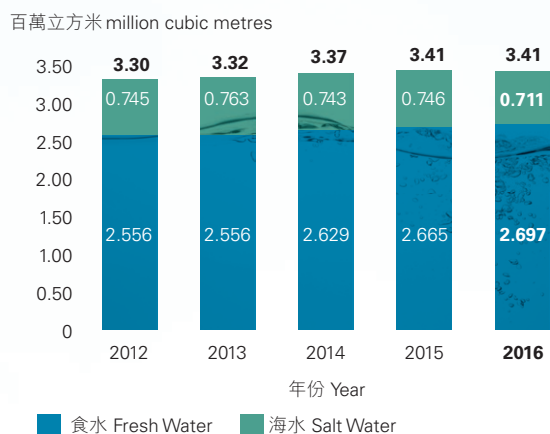
To ensure a reliable and adequate water supply for Hong Kong, it is essential for the Department to prepare for any unforeseen problems in the water supply system. For this reason, we have a crisis management plan, drought contingency plan and several other contingency plans in place to maintain a state of readiness for the rapid mobilisation of resources and coordination of emergency actions.

In addition, we nurture close contacts with other government departments through various communication channels in order to coordinate emergency responses for maintaining continuous water supplies in the event of crises.

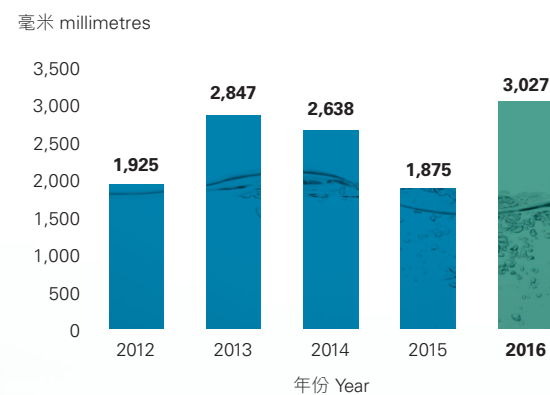
## 二零一二年至二零一六年全年供水量 Annual Quantity of Raw Water Supply 2012-2016



## 二零一二年至二零一六年總平均日耗水量(食水及海水) Total Average Daily Consumption (Fresh Water and Salt Water) 2012-2016

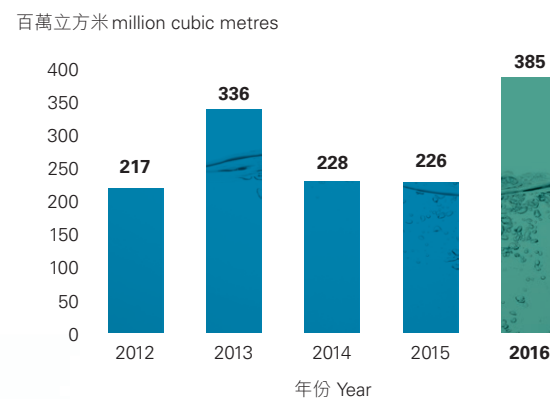


## 二零一二年至二零一六年全年降雨量 Annual Rainfall 2012-2016



註：長期平均降雨量為2,399毫米  
Note : Long Term Mean Rainfall is 2,399 millimetres

## 二零一二年至二零一六年全年集水量 Annual Yield 2012-2016



註：長期平均集水量為295百萬立方米  
Note : Long Term Mean Yield is 295 million cubic metres



二零一二年至二零一六年按用水類別劃分的食水用量(百萬立方米)佔總量百分比

Annual Fresh Water Consumption (by Sector) 2012–2016 in Million Cubic Metres (MCM) and Percentage of Total

用水類別 Sector	年份 Year				
	2012	2013	2014	2015	2016
住宅用水 Domestic	505 (54.1%)	504 (54.1%)	516 (53.8%)	526 (54.1%)	537 (54.4%)
工業用水 Industrial	59 (6.3%)	58 (6.2%)	60 (6.3%)	60 (6.2%)	60 (6.1%)
服務業及商業用水 Service Trades	236 (25.3%)	234 (25.1%)	240 (25.0%)	243 (25.0%)	246 (24.9%)
政府用水 Government Establishments	41 (4.4%)	41 (4.4%)	44 (4.6%)	43 (4.4%)	43 (4.4%)
建築及船舶用水 Construction & Shipping	18 (1.9%)	20 (2.0%)	23 (2.4%)	24 (2.4%)	23 (2.3%)
臨時淡水沖廁 Flushing	76 (8.0%)	76 (8.2%)	76 (7.9%)	77 (7.9%)	78 (7.9%)
食水總用量 Total Fresh Water Consumption	935 (100.0%)	933 (100.0%)	959 (100.0%)	973 (100.0%)	987 (100.0%)



