

## LCQ21: Management of water resources

Following is a question by the Hon Yung Hoi-yan and a written reply by the Secretary for Development, Mr Michael Wong, in the Legislative Council today (May 23):

Question:

The Office of the Ombudsman published on the seventeenth of last month a direct investigation report, pointing out that the leakage rate of water mains in Hong Kong was as high as 15.2 per cent. Such wastage was equivalent to \$530 million's worth of fresh water per year, which was enough for use by more than two million people for a year. Moreover, a think tank estimated that the fresh water lost in 2013 might have cost the Government a loss of more than \$1.3 billion of its potential revenue. Regarding the management of water resources, will the Government inform this Council:

(1) of (i) a breakdown of the unmetered water consumption, including leakages in government and private water mains, water consumed during fresh water treatment processes and for operational purposes, unauthorised water consumption and water consumed by customers but not metered due to inaccurate metering, as well as (ii) metered water consumption by customers, in each of the past three years (broken down by District Council district);

(2) of the number of complaints received by the Water Supplies Department (WSD) about fresh water mains leakage or burst and, among them, the number of those involving private fresh water mains, in each of the past three years (broken down by District Council district);

(3) of the establishment and strength of WSD staff members currently responsible for handling complaints about water mains leakage or burst, as well as the number of proactive inspections conducted by the staff members concerned each year; whether WSD has examined if the manpower for carrying out the inspections and the inspection frequency are adequate; if so, of the outcome; if not, the reasons for that; if WSD will deploy additional manpower, whether it will consider employing retired civil servants;

(4) as some members of the public have relayed that in handling leakages of private water mains, WSD failed to compel the parties concerned to carry out repairs expeditiously or arrange for repairs immediately even if a substantial quantity of fresh water was draining away, whether the authorities will carry out repairs for private water mains where appropriate to reduce fresh water wastage and alleviate the nuisances caused by water leakage to residents; if so, of the details; if not, the reasons for that;

(5) as the authorities have indicated earlier that they have been installing by phases master meters for private housing courts or estates in Hong Kong to monitor water losses in their communal water mains, of the progress and details of the relevant work, as well as the implementation timetable;

(6) regarding the Intelligent Network Management System established by WSD to detect abnormal conditions such as leakage in water supply networks, of its coverage, the progress of the works and the implementation timetable;

(7) given that water main bursts still occur from time to time despite the completion of the Replacement and Rehabilitation Programme of Water Mains in 2015, of the measures to be taken by the authorities to monitor and follow up on burst-prone water mains, and how they will prioritise the follow-up work and replacement of aged water mains, including whether they will draw up improvement work plans based on the age, leakage frequency, material, etc. of the water mains concerned;

(8) as WSD has indicated that the cost of using reclaimed water for flushing is lower than that of using fresh water and seawater, whether the authorities will allocate additional resources to study ways to improve the quality of reclaimed water so as to widen its usage;

(9) whether the authorities have assessed the effectiveness of the existing water conservation measures; of the authorities' future plans to raise public awareness of water conservation, such as enhancing public education, launching publicity programmes on water conservation, promoting the use of water-conserving devices as well as encouraging public and private organisations to conduct water efficiency reviews; and

(10) as WSD has indicated that it is conducting a consultancy study to review the "Total Water Management Strategy" implemented in 2008, whether the authorities will consider, upon the completion of the review report, setting up a dedicated task force to take charge of the formulation of a holistic policy on and measures for the sustainable management of water resources; if so, of the details; if not, the reasons for that?

Reply:

President,

Hong Kong has a hilly terrain. In order to maintain adequate water pressure to premises located at high altitude, the water pressure of our water supply networks is higher than that of other countries and cities (e.g. Singapore and Japan). Moreover, the congested underground utilities, busy road traffic and frequent roadworks also bring about much vibration and disturbance to the underground water mains. All these factors increase the chance of mains bursts and leakage, thus making it a great challenge to manage the leakage problem in the water supply networks in Hong Kong.

In the 1990s, as a substantial portion of government water mains were reaching the end of their service life, their maintenance had become increasingly difficult and costly. In 2000, the number of mains bursts had risen to about 2 500 and the leakage rate of water mains had exceeded 25 per cent. Replacement and rehabilitation of water mains was then the most effective solution to stop the rapid increase in main bursts and leakages.

Therefore, we launched the 15-year "Replacement and Rehabilitation of Water Mains" programme in 2000 and had in stages replaced and rehabilitated about 3 000 kilometres of aged water mains in Hong Kong.

At present, the condition of the government water supply networks has improved significantly. The number of main bursts has dropped substantially to about 90 in 2017 and the leakage rate of water mains to about 15 per cent. Hong Kong currently ranks in the middle range in terms of leakage rate of water mains among other developed countries and cities. Notwithstanding the above-mentioned challenges in managing the leakage problem of the water supply networks, we have set a target to reduce the leakage rate of government water mains to below 10 per cent by 2030.

The Water Supplies Department (WSD) is progressively establishing a Water Intelligent Network (WIN) by setting up District Metering Areas (DMAs) to collect data from the water supply networks with a view to implementing cost-effective water mains repair and improvement works strategically. The works of the first stage of the WIN has been started in 2016. We plan to seek funding approval from the Finance Committee of the Legislative Council for the works of its second stage and expect to complete the whole WIN project in 2023.

My reply to the Hon Yung Hoi-yan's questions is as follows:

(1) The percentages of the unmetered consumption to the total fresh water consumption in 2015 and 2016, were comparable at about 33 per cent; of which "leakage in government and private water mains", "fresh water used in water treatment and operation purposes", "unauthorised water consumption" and "water consumed by users but not metered due to inaccurate metering" were 23 per cent, 6 per cent, 2 per cent and 2 per cent of the total fresh water consumption respectively. The remaining 67 per cent was the metered customer consumption. The corresponding percentages for the water consumption in 2017 are not yet available as the concerned data are still under processing. We also have not kept the corresponding percentages according to the demarcation of District Councils.

(2) The WSD handled a total of 24 088 complaint cases about fresh water main leaks or bursts over the past three years. Among these complaints, 2 845 cases involved private fresh water mains and 21 243 cases were related to government fresh water mains.

As the WSD has not kept these leakage and burst reports of private fresh water mains by the demarcation of District Councils, such statistics are not available. A breakdown of the leakage and burst reports by the four operation regions of the WSD (i.e. Hong Kong, Kowloon, New Territories East and New Territories West) in the past three years are out at annex.

(3) At present, the WSD staff responsible for handling water main burst incidents are in the four operation regions and their duties include repair of the water main leak or burst and maintenance works of the water supply networks etc. The staff establishment and the strength are 350 and 280

respectively. The vacancies are mostly of artisan and workman grades, mainly due to surge of retirement, recruitment difficulty and relevant recruitment exercises being in progress. To alleviate the short term demand, the WSD has employed retired civil servants and arranged outsourcing part of the work to term contractors. Apart from the operation regions, the WSD has set up water loss management sections which are responsible in managing leakage in the water supply networks in Hong Kong; and their work includes inspection of networks, planning and conducting leak detection etc. The staff establishment and the strength of the water loss management sections are 90 and 65 respectively; and for the same reason mentioned above, most of the vacancies are also of the artisan and workman grades. The WSD has also outsourced part of the water leakage management work to the leak detection specialist contractors. Apart from filling the vacancies, we will review from time to time the staffing requirement in handling the work of water mains bursts and leaks. In 2017, the WSD conducted about 3 300 site inspections and water main leak detections on water supply networks and detected about 1 100 cases of leakages.

(4) Pursuant to the Waterworks Ordinance (Cap. 102) (WVO), the consumer or agent is responsible for the custody and maintenance of the inside service. In the event of a leakage or main burst in the inside service, the WSD will issue a "Repair Notice" to the consumer or agent responsible for its maintenance to require him/her to carry out repair works within a specified time limit according to the established procedures. The WSD would issue a "Disconnection Notice" to the consumer or agent concerned if he/she fails to complete the repair works within the time limit. The water supply would be disconnected seven days after the issuance of the "Disconnection Notice" if the repair works have not been completed by that time.

Although repair of leakage or burst within inside service is the responsibility of the consumer or agent, the WSD will provide technical advice or support to the consumer or agent upon request. In addition, under certain special circumstances, for example if the consumer or agent encounters great difficulty in coordinating and carrying out the repair works, numerous consumers are involved, or the consumer or agent fails to undertake the responsibility stipulated in the WVO even with due diligence, or cases of emergency, the WSD may consider, on a discretionary basis, carrying out the necessary repair works on behalf of the consumer or agent. Upon completion of the repair works, the WSD will issue a demand note to the consumer or agent concerned to recover the cost.

(5) Since 2006, all new private housing or public rental housing (PRH) estates with two or more building blocks have been installed with master meters. The WSD has also been progressively installing master meters for other existing large private housing or PRH estates. Currently, master meters have been installed in about 500 private housing or PRH estates. Through the master meters, the WSD monitors water losses in the communal mains of these estates and will follow up on cases with suspected water leakages. The WSD will determine the priority of the follow up actions according to the leakage levels. As mentioned above, the WSD is establishing the WIN progressively and expects that most of the large private housing or PRH estates will have

installed with master meters by the time the WIN project is completed. For the remaining large private housing or PRH estates, the WSD is studying to progressively install master meters in these estates based on the assessment of risk of mains leakage.

(6) Under WIN, the whole fresh water distribution network will be divided into about 2 000 DMAs in Hong Kong. Up to now, we have established about 1 100 DMAs and anticipate that the remaining DMAs can be established by 2023. We are also procuring an Intelligent Network Management Computer System (INMS) to assist in analysing the tremendous network data collected from the DMAs, thereby enabling continuous monitoring of the network performance. The INMS can help detect timely those DMAs of abnormal conditions so that we can apply appropriate and effective network management measures (including water main leakage detection and control, reducing leakage through pressure management, repair of water mains with leaks and bursts and reprovisioning of water mains beyond economic repair). We anticipate that the INMS will be ready for operation by the end of 2019.

Although the INMS is still being established, we have already taken actions on water mains with suspected leakages based on data collected from individual DMAs that have been established. For example, last year the WSD detected abnormal data in the DMAs in Yuk Wah Street of Tsz Wan Shan, Kwei Chow Street of To Kwa Wan and Cheung Chau. After conducting leak detection and repair of the water mains with identified leakage, the water loss situation in these DMAs had improved significantly.

(7) The WSD is proactively taking various measures to control the water main bursts and leaks. These measures include the use of more durable and anti-corrosive pipe materials in replacement of aged water mains, implementation of corrosion protection measures and reduction of water pressure to effectively extend the service life of existing water mains. For critical water mains with a relatively large impact on the water supplies and other aspects (e.g. traffic), the WSD would carry out condition assessment and use a risk-based approach (taking into account pipe materials, service year, burst and leak record etc.) to determine rehabilitation or replacement strategies and priorities, in order to reduce water main bursts or leaks. For other water mains with smaller impact, we would closely monitor the situation through water mains burst hot spots, and coordinate with relevant stakeholders and government departments to implement improvement measures as soon as possible, all with a view to preventing repeated water main burst or leak incidents.

(8) The WSD has established the reclaimed water quality standards for suitable non-potable uses, including toilet flushing, landscape irrigation and street cleansing. As the water consumption in non-potable uses is mainly for toilet flushing, the WSD will take the opportunity arising from the expansion of Shek Wu Hui Effluent Polishing Plant and upgrading of its sewage treatment technology, to further process the tertiary treated effluent from the plant for production of reclaimed water for supply as flushing water to the north-eastern part of the New Territories starting with Sheung Shui and Fanling from 2022 onwards. The supply of reclaimed water within this area is

considered cost-effective because the additional process required for producing reclaimed water from tertiary treated effluent is relatively simple thus leading to a lower cost for the flushing supply by reclaimed water as compared with fresh water or salt water. The WSD will continue to review the situation and, subject to technical feasibility and cost-effectiveness, extend the reclaimed water supply to other areas. Apart from this, the WSD will further explore the use of reclaimed water for other applications such as landscape irrigation and street washing.

(9) The WSD promulgated the Total Water Management Strategy in 2018, putting an emphasis on containing the growth of water demand through promoting water conservation and exploiting new water resources. The WSD has been taking forward a host of measures to promote water conservation. Based on a domestic water consumption survey conducted in late 2015 to early 2016, the WSD revealed that the public awareness on water conservation had risen in general.

The WSD will continue to collaborate with non-government Organisations and green groups to promote water conservation through various activities. The WSD launched the "Cherish Water Campus" Integrated Education Programme (IEP) in primary schools since the 2015/16 school year. Currently, there are 255 primary schools joined the programme which accounts to more than 40 per cent of the primary schools in Hong Kong. The WSD also launched a pilot scheme for extending the IEP to kindergartens in the 2017/18 school year, and plans to launch the programme in full in the 2018/19 school year. To enhance public's understanding about water resources and water conservation, the WSD is setting up a permanent water resources education centre in Tin Shui Wai, which is expected to be completed in early 2019.

At the same time, the WSD has conducted water efficiency audits for the high water consumption industries including hotel and catering sectors, and promulgated the "Best Practice Guidelines on Water Usage" for these two sectors in 2016, encouraging them to use water efficient equipment to enhance water efficiency and conserve water. The WSD has also conducted water efficiency audits for government departments with high water consumption and promulgated "Best Practice Guidelines on Water Usage" to facilitate these departments to conserve water.

The WSD will continue to install water efficient devices in PRH estates, government venues and schools. Currently, flow controllers have been installed in taps and showers of 129 000 households at 88 PRH estates, while the WSD will continue to distribute flow controllers for free to those who participate in the "Let's Save 10L Water" Campaign and those who successfully apply for e-Bill service. Besides, we are retrofitting the water using devices (such as taps and showers, etc.) in suitable government venues and schools with water-efficient ones, with more than 50 000 devices installed so far.

Apart from the above measures, we have implemented the first stage of Mandatory Water Efficiency Labelling Scheme (WELS) since February 2018 mandating the use of water-efficient devices registered under WELS in new

buildings and for the plumbing works of existing buildings for kitchens of domestic premises and bathrooms and toilets in all premises. We are exploring, through legislation, mandating water efficient labels for designated water using devices on sale in the retail market to enable consumers to choose to buy water-efficient products for water conservation.

(10) The consultants of the WSD are conducting a study to review the Total Water Management Strategy. Apart from evaluating the effectiveness of the Strategy under implementation, the review study includes making recommendations on updating of the water management strategy to cope with challenges such as effect of climate change on water resources, increasing demand for fresh water due to population and economic growth and keen demand on water resources in the Pearl River Delta region, thus ensure long-term stability of water supply in Hong Kong. The government has established a steering committee comprising members from the Development Bureau, Environmental Protection Department, Drainage Services Department, WSD and other relevant bureaux and departments to steer the review study, review its recommendations and update the water management strategy. We expect that the review study of the Strategy will be completed in 2018.