



Water, Power and Gas Supplies

WATER SUPPLIES

Providing an adequate water supply for Hong Kong has always been difficult because there are no natural lakes, rivers or substantial underground water sources. The annual rainfall averages 2 382.7 millimetres but this is insufficient to meet current demands — the average daily consumption of potable water during 2008/09 being 2.62 million cubic metres.

The Water Supplies Department is a government department providing potable water to the people living within the Hong Kong Special Administrative Region. The department also supplies sea water for flushing.

Sources of Water: Hong Kong's two main sources of water are rainfall from natural catchments and Dongjiang water from Guangdong Province. Shortage of natural storage reservoir sites led to the construction of Hong Kong's first 'reservoir in the sea' at Plover Cove. The initial scheme, completed in 1967, was created by damming, and draining an inlet of Tolo Harbour and had a storage of 170 million cubic metres. The storage was increased in 1973 to 230 million cubic metres by raising the dam. A similar but larger scheme at High Island, completed in 1978, has a capacity of 281 million cubic metres. The total storage capacity of Hong Kong's reservoirs is 586 million cubic metres.

Supply from Guangdong: Dongjiang is Hong Kong's major source of water. Dongjiang water first started to be supplied to Hong Kong in 1965. Today, about 70-80 per cent of water comes from Dongjiang by arrangement with the Guangdong authorities. 621 million cubic metres of Dongjiang water was imported in 2008/09. The Dongseng-Hong Kong water supply system is designed to be capable of providing Hong Kong with 1.1 billion cubic metres per annum.

Sea Water for Flushing: An interesting facet of the waterworks is the sea water supply systems with their separate networks of distribution mains, pumping stations and service reservoirs. In 2008/09, an average of about 743 000 cubic metres of sea water was supplied each day.

Consumption (in million cubic metres):

	2007/08	2008/09
<i>Fresh Water</i>		
Annual	950.00	957.31
Daily Average	2.60	2.62
Highest Daily	2.81	2.86
<i>Sea Water</i>		
Annual	274.23	271.08
Daily Average	0.75	0.74

Rainfall and Yield: About one-third of Hong Kong's 1 098 square kilometres has been developed as water catchments.

	2007/08	2008/09
<i>Rainfall (in mm)</i>		
Rainfall recorded by the Hong Kong Observatory	1760.8	3070.0
Average rainfall recorded in water catchments	1533.6	2520.9
<i>Yield (in million cubic metres)</i>		
Yield from catchment areas		
Old Reservoirs	87.07	113.52
Plover Cove and High Island Systems	100.67	219.00
Water Received from Guangdong by pipeline	754.28	620.76
Total	942.02	953.28

Reservoir Storage: Hong Kong is dependent on adequate storage for the maintenance of a regular supply. The reservoirs and their storage capacities are tabulated below:

Reservoir	Year on Supply	Storage Capacity ^{m³}
Pok Fu Lam	1877	233 000
Tai Tam Upper	1889	1 490 000
Tai Tam Byewash	1904	80 000
Tai Tam Intermediate	1907	686 000
Kowloon	1910	1 578 000
Tai Tam Tuk	1917	6 047 000
Shek Lei Pui	1925	374 000
Reception	1926	121 000
Aberdeen (2 Res.)	1931	1 259 000
Kowloon Byewash	1931	800 000
Shing Mun (Jubilee)	1936	13 279 000
Tai Lam Chung	1957	20 490 000
Shek Pik	1963	24 461 000
Lower Shing Mun	1965	4 299 000
Plover Cove	1968	229 729 000
High Island	1978	281 124 000

Consumer Services:

	2007/08	2008/09
Additional no. of accounts (nett)	14 500	36 300
No. of accounts as at April 1	2 691 300	2 727 600

Water Treatment: The supply is fully treated by chemical coagulation, sedimentation (at most treatment works), filtration, pH value correction, chlorination and fluoridation. The water is soft in character and conforms in all respects — both chemically and bacteriologically — to the Guidelines for Drinking-water Quality recommended by the World Health Organization.

ELECTRICITY

Electricity is supplied by CLP Power Hong Kong Limited and The Hongkong Electric Company Limited which are investor-owned and do not operate on a franchise basis. The companies have entered voluntarily with the Government into mutual agreements (Scheme of Control Agreements) concerning their financial affairs.

CLP Power Hong Kong Limited (CLP Power), founded in 1901, supplies electricity to Kowloon and the New Territories, including Lantau, Cheung Chau and most of the outlying islands.

CLP Power's local maximum demand in 2008 was 6 749 MW, while local sales amounted to 30.1 billion kWh. At the year end, the company had 2.29 million customers.

At present, electricity is generated by three power stations, namely, Castle Peak (4 108 MW), Black Point (2 500 MW) and Penny's Bay (300 MW), with the total installed capacity being 6 908 MW. All these power stations are owned by Castle Peak Power Company Limited (CAPCO), 60% of which is owned by ExxonMobil Energy Limited and 40% by CLP Power. CLP Power has contracted to purchase about 70% of the power generated at the two 984 MW pressurised water reactors at the Guangdong Daya Bay Nuclear Power Station, some 50 kilometres from Hong Kong, to help meet the long term demand for electricity in its supply area. It also has the right to use 50 per cent of the 1 200 MW capacity of Phase 1 of the Guangzhou Pumped Storage Power Station, at Conghua.

Wholly owned by CLP Power, the transmission system operates at 400kV and 132kV while distribution is mainly at 33kV, 11kV and 380V. The supply is 50Hz alternating current, at 220V single-phase or 380V three-phase. For bulk customers, supply is available at 132kV, 33kV and 11kV.

An extra high voltage transmission system, at 400kV, transmits power from the Castle Peak and Black Point Power Stations to the various load centres. It comprises 503 kilometres of double-circuit overhead line encircling the New Territories, 52 kilometres of cables and 11 extra high voltage substations.

By the end of 2008, CLP Power had 214 primary and 12 914 secondary substations in its transmission and distribution network.

The company's power system has been interconnected with the Guangdong power system since April 1979 and electricity is exported to Guangdong Province. 80 per cent of the profit is given back to CLP Power's local customers.

The Hongkong Electric Company Limited (HEC), founded in 1889, supplies electricity to Hong Kong Island, Ap Lei Chau and Lamma Island. Electricity is supplied from the Lamma Power Station. At the end of 2008, the total installed capacity of the station was 3 756 MW.

The maximum demand in 2008 was 2 589 MW, and sales of electricity for the year amounted to 10.9 billion kWh. At the year end, the company had 0.56 million customers.

The transmission system of HEC operates at 275kV and 132kV, whereas distribution is effected mainly at 22kV, 11kV and 380V. The supply is 50Hz alternating current, at 220V single-phase or 380V three-phase. With the exception of a few short lengths of 132kV overhead

transmission lines, the entire transmission and distribution system is composed of underground cables.

By the end of 2008, HEC had 50 switching/zone substations and 3 648 consumer substations.

The interconnection of the company's transmission system with that of the CLP Power by a cross-harbour link has an installed capacity of 720 MVA enabling the provision of emergency support to each other during generator failure and hence reduces potential loss of supply to customers.

GAS

Town gas, liquefied petroleum gas (LPG) and natural gas are the main types of fuel gas used in Hong Kong for domestic, commercial and industrial purposes. LPG is also used as a fuel by taxis and light buses while natural gas is used for electricity generation and production of town gas.

Hong Kong has about 2.3 million gas customers in the domestic, commercial and industrial sectors. In 2008, Town gas accounted for 83% of total fuel gas sold in these sectors, while LPG accounted for the remaining 17%.

Towngas is manufactured at plants in Tai Po and Ma Tau Kok, the former using natural gas and naphtha as dual feedstock and the latter using naphtha as feedstock. They have output capacities of 9.66 and 2.6 million cubic metres per day respectively. Town gas is supplied through an integrated distribution system to about 1.67 million customers. The mains network extends throughout Hong Kong via a 211-kilometre high-pressure pipeline and some 3 200 kilometres of distribution mains.

LPG is imported into Hong Kong by sea and stored at five terminals on Tsing Yi Island before being distributed to approximately 0.7 million customers and 58 LPG filling stations. In 2008, about 14% of the gas sold was in cylinders provided by some 245 appointed gas distributors. About 11% was distributed to bulk storage installations which piped the gas to residential and commercial developments, and the remaining 75% to filling stations as fuel for more than 21 000 LPG taxis and light buses. Cylinder LPG is now used in about 20% of households.

Natural Gas is imported from the Mainland China via submarine pipelines to the Black Point, Castle Peak and Lamma Power Stations for electricity generation and to Tai Po plant for production of town gas.

On August 28, 2008, the Hong Kong SAR Government and the National Energy Administration signed the Memorandum of Understanding (MOU) on the enhanced supply of natural gas to Hong Kong in the coming two decades among other things. According to the MOU, the Central People's Government (CPG) supported China National Offshore Oil Corporation's renewal of its supply agreement with Hong Kong for a further term of 20 years. It was also agreed in principle that the feasibility of supplying natural gas to Hong Kong via the Second West-East Natural Gas Pipeline will be studied, and an LNG terminal will be jointly built in the Mainland for supply to Hong Kong. The future level of gas supply to Hong Kong would, as a result, be over and above the current level, and Hong Kong can also benefit from improved air quality by increasing the use of clean energy and reducing the emission of power plants.