

Table 15: Population and Coastal Cities of China (2010)²⁷⁶

	Number of cities		Total population (billion)	
	Coastal	Total	Coastal	Total
Pearl River Delta	8 ²⁷⁷	9 ²⁷⁸	0.028 ²⁷⁹	0.032 ²⁸⁰
Guangdong Province	14 ²⁸¹	22 ²⁸²	0.058 ²⁸³	0.107 ²⁸⁴
China	53 ²⁸⁵	657 ²⁸⁶	0.243 ²⁸⁷	1.37 ²⁸⁸

Water Challenges in Coastal Regions

Rapid urbanisation imposes significant burden on fresh water and seawater systems worldwide

Water scarcity and lack of sanitation continue to be worldwide issues that are in many ways interlinked. Toilet-flushing is the key element of modern sanitation systems, especially in cities. Rapid urbanisation in coastal regions has created and will continue to impose a tremendous burden on both the fresh water and seawater systems. Toilets alone will strain the systems as flushing water usually represents 20-30 per cent of domestic water demand; and up to 70 per cent of water demand in commercial buildings.²⁸⁹

China urgently needs novel solutions to combat water pollution and proper waste disposal including sludge

In China, water scarcity is a long-standing problem worsening due to climate change and pollution. Problems emerge from river basins, are translated to the coastal regions, and then progress to the sea. Over the past 20 years, mainstream water flows have declined by 41 per cent in the Hai River Basin and 15 per cent in the Yellow River and Huai River Basins.²⁹⁰ This has significantly reduced the loading capacity and natural purification ability of the waters and, in turn, worsened water pollution problems. To improve water quality, China has been constructing a large number of sewage treatment plants. The operation of sewage treatment plants generates a large amount of sludge, requiring treatment and disposal.

4.4.2 Challenges and Opportunities

Global Challenges of Living on the Edge

The global coastal areas urgently need environmentally-friendly and economical solutions to deal with effluent and solid discharge

The world's coastal areas are not only using a tremendous amount of water, but are also discharging an enormous amount of wastewater (treated or untreated) directly into the sea, to the direct detriment of ocean ecosystems. Conventional sewage treatment processes produce large quantities of waste sludge, and current sludge-minimisation, treatment and disposal technologies are unsustainable²⁹¹. More economic and environmentally-friendly solutions are urgently needed.

Hong Kong is in a unique position to make major contributions to the novel solutions

Opportunities for Hong Kong

Hong Kong is part of the problem, but is also in a position to contribute to the solution. Increasing water self-reliance is the general trend for cities and regions worldwide due to the threat of climate change and resource shortages. Hong Kong is no exception and it must do everything in its power to move in this direction. For example:

- Under “One Country, Two Systems” and while the Dongjiang’s water is still flowing and available, Hong Kong can take bold actions to raise the city’s water self-reliance. This can be done through integrated solutions with a holistic approach.
- Hong Kong should become an example of a “knowledge centre”, for coastal China, especially as it has pioneered systems such as the dual-water supply system, sewerage and storm-water separation, seawater toilet flushing, innovative waterworks in the sea and other new technologies, in order to move towards a complete solutions to food, water, energy and sanitation.²⁹²
- Hong Kong was one of the earliest cities in China to adopt a modern drainage system, separating sewage and storm-water over 100 years ago. This practice is now required by the Chinese government to prevent urban floods, combat epidemics and facilitate drainage management.²⁹³
- Although the potential of a rainwater harvesting system has yet to be explored, Hong Kong can be very helpful in providing Mainland China with practical ways to achieve this, especially in fellow coastal cities.

4.4.3 Potential for Hong Kong’s Water Economics: China’s Water Technology Hub?

A potential market niche for Hong Kong in the water economy lies in alternative water-resources solutions and water treatments.

The World Water Market Trend

a) Alternative Water Resources

Reused water (either reclaimed or grey-water reuse) is increasingly considered a sustainable supply of water for some uses.²⁹⁴ Desalinated seawater is another widely-accepted alternative water source for potable purposes. However, the direct use of seawater as well as an integrated system containing

Integrated fresh water, grey water and seawater systems have potential

fresh water, grey water and seawater are being developed, and have potential in coastal regions.²⁹⁵

b) Water Treatment

China and India will lead fast market growth in the water treatment sector

Global demand for water treatment technology and service products was projected to increase by 5.7 per cent per year reaching US\$59 billion in 2013, well above the rate of economic growth in almost every region. China and India will register the fastest growth in the next few years.²⁹⁶

According to two recent market reports cited by *WaterWorld Magazine*, the marketplace for water treatment is evolving, with smaller players filling local needs as the influence of larger, global companies wanes.²⁹⁷

The China Water Market Trend

a) Alternative Water Resources

The newly released national policy made the market for alternative water resources clear and sizable

The newly released national “Urban Drainage and Wastewater Treatment Regulations 《城鎮排水與污水處理條例》” will be effective from 1 January 2014. The regulations call for sewage and storm-water separation in newly built areas; emphasise urban wastewater treatment in the context of resource recycling and pollution improvement, and demands that all reclaimed water be included in total water resources allocation schemes.²⁹⁸ Many cities have already set their water reuse targets. The market potential for investment is clearly sizable.²⁹⁹

b) Water Treatment

Despite increasing wastewater treatment, sludge remains problematic and requires urgent handling

In the past seven years, China’s investment in wastewater treatment alone accounted for more than RMB500 billion (about US\$81.5 billion) and has increased urban wastewater treatment capacity to cover 70 per cent of its total wastewater emissions. However, at least 80 per cent of the resulting sludge is neither treated, nor properly managed. This has caused secondary pollution, damage to the environment, and food safety concerns.³⁰⁰

China’s water treatment and reuse market is a low hanging fruit for the rest of the world

The world has its eyes on China’s enormous water treatment and reuse market. The Asian Development Bank recently announced that it will support China’s efforts to improve its wastewater management and reuse with a US\$240 million private sector loan package³⁰¹. Singapore entered this market in 2006 and China is now its second largest market in this area³⁰².

Hong Kong's innovative solutions and connection to China place it in a position to transform into China's water hub

Hong Kong is obligated to help, and in a position to do so. Compared with other investors, it has deeper roots in China and its entrepreneurship has developed side by side with Mainland reform. Shared culture and economic bindings enable better understanding and allow for tailor-made approaches to finding local solutions for water management problems. In short, Hong Kong has a golden opportunity to help the country while helping itself via an integrated water solution. In doing so, it can turn Hong Kong into China's water hub.

4.5 Policy Recommendations

4.5.1 Put Water Back on the Policy Agenda

Hong Kong is running out of time for a long-term water strategy that closes the water loop

The HKSAR Government clearly needs to focus more on water policy, and address the issue proactively and holistically with a long-term view. Waterworks projects can take decades from planning to operation. Also, Hong Kong needs an improved total water management strategy that closes the water loop, increases water self-reliance and is sustainable for future generations, should the territory be faced with extreme conditions.

4.5.2 Envision Water Solutions to Envision Hong Kong beyond 2047

Hong Kong needs to look beyond 2047 to instil long-term vision and drive progress

The HKSAR Government must start to reset its mind-set to look beyond 2047. It should do this by encouraging the whole society to envision all the pathways of Hong Kong beyond "One Country, Two Systems" and look down the "water road" that can take us there. Looking at vital issues such as water can help to instil long-term vision, a sense of mission and the society's commitment to drive progress across the board.

4.5.3 Set an Integrated Management Mechanism to Close the Water Loop

Consider integrating all water handling departments and repositioning DSD as an alternative resources department

The HKSAR Government should consider integrating all departments that handle water matters into one agency. This will help close the water loop in terms of supply and drainage resource management and control costs from a total lifecycle perspective. Even before this happens, the HKSAR Government should consider repositioning the DSD as an alternative water resources manager. This would be helpful in changing "waste-and threat-response"-oriented thinking into a more resource-

appreciating mind-set, and eventually contribute to a holistic water solution for Hong Kong and its neighbours.

4.5.4 Improve Local Water Management

Fix Hong Kong's own water problems first

Hong Kong needs to know its own water systems better in order to face the challenges ahead constructively and imaginatively. In regard to this, Civic Exchange's policy recommendations published in the previous water policy research reports, *Liquid Assets II, III and IV*, stand valid and are attached in Appendix 2.

4.5.5 Capitalise on Hong Kong's Characteristic Seawater Solutions

Accelerate development of innovations from lab to market to capitalise on Hong Kong's lead in seawater solutions

The HKSAR Government should urge the ITC to accelerate the development of innovations from laboratory to market. Specifically, the HKSAR Government and ITC can establish a task force to study how to provide policy, financial and talent support to promote and capitalise on Hong Kong's unique lead in seawater solutions. Hong Kong should strive to become the Water Technology & Innovation Hub of China.

4.5.6 Be Ready to Offer Wastewater Solutions

Hong Kong has R&D, policy platform and hands-on expertise in wastewater treatment that is ready to assist coastal China

Hong Kong's recognised expertise in wastewater treatment R&D and in operating systems right across the urban water cycle³⁰³ form a solid foundation from laboratory to market:

- The 2008 joint "Cleaner Production Partnership Programme"³⁰⁴ between Hong Kong and Guangdong has already identified "Reducing and Controlling Effluent Discharge" as one of its key objectives;
- The Cleaner Production Partnership Programme (CPPP) has established a mechanism between the HKSAR and Guangdong Governments to work closely to address issues;
- The CPPP has been extended by two years to 31 March 2015, with additional funding of HK\$50 million.

Hong Kong must grasp the opportunity to become China's water hub

The Hong Kong Productivity Council (HKPC) is the implementation agent for the CPPP. HKPC and the HKSAR Government should grasp this opportunity to enlarge a valuable market niche and press forward to establish Hong Kong as a "Water Knowledge Centre", a "Wastewater Treatment Training Base", and a "Water Technology Hub" of China.

If we do not do it, others will.

Appendix 1

Conversion Tables

Currency Conversion Table			
US\$	1	<—>	HK\$ 7.75
US\$	1	<—>	RM 3.22
US\$	1	<—>	S\$ 1.25
US\$	1	<—>	RMB 6.09
HK\$	1	<—>	RM 0.42
HK\$	1	<—>	RMB 0.79
HK\$	1	<—>	S\$ 0.16
S\$	1	<—>	RM 2.57

Water Volume Conversion Table		(metric vs imperial)	
1 Cubic Metre	=	219.78	Gallons
1 Gallon	=	0.00455	Cubic Metres

Appendix 2

Policy Recommendations from *Liquid Assets II – Industrial Relocation in Guangdong Province and Its Threats to Water Resources, Liquid Assets III – Dongjiang Overloaded, and Liquid Assets IV – Hong Kong’s Water Resources Management Under One Country, Two Systems:*

The HKSAR Government would be well advised to:

1. Synchronise with New Mainland Water Policy:

On February 2012, the State Council promulgated the 'Opinion on Implementing a Strict Management System for Water Resources'.

This establishes limits on the development, use and protection of water resources. All local authorities are to “base their needs on water availability and act according to water availability”.

While the “One Country, Two Systems” principle guides Mainland-Hong Kong relations, Hong Kong should not ignore the new State Council policy because the water resources that supply Hong Kong are in the Mainland.

The PRD cities under the Dongjiang water allocation arrangements are governed by the new policy, thus Hong Kong should take it upon itself to observe the same policy.

Indeed, under the “One Country, Two Systems” principle, the new Hong Kong administration taking power on 1 July 2012 can put forward its own policy that reflects Mainland policy so that Mainland-Hong Kong policies on water resources can be appropriately synchronised.

2. Devise Long-Term Strategy before Water Renegotiations

The current water supply agreement between Guangdong Province and Hong Kong will have to be renegotiated before expiration in 2014. This gives the CY Leung administration less than a year to devise and consult on a long-term water strategy that emphasises water conservation in Hong Kong, as well as collaborate with Guangdong Province and other stakeholders to protect and manage the water resources of not only the Dongjiang but also the whole Pearl River Basin.

Under this strategy, the HKSAR Government should consider:

- Promptly call for an independent audit of Hong Kong’s seawater toilet flushing system to conserve public funds and reduce waste;

- Perform a cross-agency comprehensive audit of the complete lifecycle cost of Hong Kong's water resources and establish an accounting mechanism for comprehensive water resources management;
- Re-examine its water pricing structure on the condition that the "user pays" principle is truly reflected and that the grassroots' interests will be protected;
- Hong Kong should be open to explore whether it can set a cap on water usage and progressively reduce it;
- Consult the public and set goals regarding the raising of Hong Kong's water self-reliance;
- Perform public outreach to help residents understand the source of their fresh water, the significance of Dongjiang water, and the challenges raised by the integrated development plans of the PRD. This would rally public opinion and facilitate changes in water use habits;
- Set a higher target to reduce leakage rate: Even though the WSD has already accelerated the original plan by five years to replace old water pipes by 2020, the leakage rate will still be 15 per cent. The US, Japan, France and Germany have leakage rates below 10 per cent. Tokyo's water leakage rate is only 3.3 per cent so Hong Kong can do better;
- Set comprehensive policies and mid- to long-term goals for water recycling. These policies and goals must consider important factors such as climate change, energy efficiency, reduction of emissions, poverty reduction and benefits to the elderly;
- Investigate alternatives for ensuring a 99 per cent reliability rate for Hong Kong's water supply;
- Investigate its responsibilities with respect to sharing water resources to carry out its obligations and uphold social justice under "One Water, Two Systems";
- Improve water efficiency and mandatory labelling: The entire public sector can lead by replacing water faucets and other water equipment to improve efficiency. Newly built public sector buildings, including housing, can be fitted with water efficiency equipment; and the Government can consider whether it would be appropriate to move from the current voluntary to mandatory water efficiency labelling; and
- Reuse water wherever possible: Programmes to harvest rain water, use grey water and recycle water should be enhanced and expanded.

Appendix 3

The 3P Approach includes several initiatives to actively engage and involve the community, making the protection and conservation of water everyone's responsibility.

Year	Campaign	Action
2003	Water Efficient Homes	Encourage installation of water saving devices and conservation practices in homes
2004	Water Efficient Building Programme	Encourage building managers and owners to make their building's water efficient
2006	10 Litre Challenge	Encourage households to reduce water consumption by 10 litres a day
2006	Active Beautiful and Clean (ABC) Water	Clean, preserve and protect bodies of water
2007	Water Efficiency Fund	Provide business funding to implement water conservation measures
2008	10per cent Challenge	Encourage non-domestic consumers to reduce water consumption by 10 per cent monthly

Endnotes

1. People's Government of Guangdong Province (2008), '東江流域水資源分配方案', No. (2008) 50, <http://search.gd.gov.cn/detail?record=20&channelid=8907> (accessed on 20 December 2013).
2. Liu, S., 'A Vulnerable Dongjiang is a Vulnerable Hong Kong', *China Water Risk*, 11 July 2012, <http://chinawaterrisk.org/opinions/a-vulnerable-dongjiang-is-a-vulnerable-hong-kong/> (accessed 10 November 2013); Liu, S., *Liquid Assets IV: Hong Kong's Water Resource Management under "One Country, Two Systems"*, July 2013, Civic Exchange, http://www.civic-exchange.org/wp/201307liquidassets4_en/ (accessed 10 November 2013); Liu, S., *Liquid Assets IIIA: Dongjiang Overloaded – 2011 Dongjiang Expedition Report*, May 2012, Civic Exchange, http://www.civic-exchange.org/wp/201205overload_en/ (accessed 9 November 2013).
3. 'Hong Kongers should cut their water consumption experts say', *South China Morning Post*, 23 August 2013, <http://www.scmp.com/lifestyle/article/1298591/hongkongers-should-cut-their-water-consumption-experts-say> (accessed 20 November 2013).
4. Ibid.
5. Ibid.
6. Census and Statistics Department of the HKSAR Government, 'Population', last update on 18 November 2013, <http://www.censtatd.gov.hk/hkstat/sub/so20.jsp> (accessed 20 November 2013).
7. In June 2013, the author contacted the Water Supplies Department of the HKSAR Government to request data on the annual total water consumption from 1965 to present, and received a response the same month.
8. Data for 1980 and earlier Censuses refer to all persons present in Singapore and enumerated on Census Day. Data from 2000 onwards are based on the register-based approach. Total population comprises Singapore residents and non-residents. Resident population comprises Singapore citizens and permanent residents. Data from 2003 onwards exclude residents who have been away from Singapore for a continuous period of 12 months or longer as at the reference period. See <http://www.singstat.gov.sg> (accessed 10 November 2013).
9. Figures for years 2000 to 2012 based on water sales in Singapore found in: Ministry of the Environment and Water Resources of the Republic of Singapore (2013), 'Water Resource Management', <http://app.mewr.gov.sg/web/Contents/contents.aspx?ContId=682> (accessed 7 November 2013); Department of Statistics of the Republic of Singapore (2009), 'Yearbook of Statistics Singapore 2009', <http://cec.shfc.edu.cn/download/c4fbbb07-709a-4353-9057-006c594d2d37.pdf> (accessed 7 November 2013). Figures for years 1970 to 1990 from: Lee, P.O., 'The Water Issue Between Singapore and Malaysia: No Solution in Site?', *Economics and Finance no.1*, January 2003, Institute of Southeast Asian Studies, <http://www.iseas.edu.sg/documents/publication/ef12003.pdf> (accessed 7 November 2013).
10. Tortajada, C., Joshi, Y.K., Biswas, A.K., *The Singapore Water Story: Sustainable Development in an Urban City State*, p. 85, April 2013, Routledge, <http://www.routledge.com/books/details/9780415657839/> (accessed 13 December 2013).
11. HKSAR Government (2013), 'Hong Kong – The Facts', <http://www.gov.hk/en/about/abouthk/facts.htm> (accessed 7 November 2013).
12. Department of Statistics of the Republic of Singapore (2013), 'Latest Data', http://www.singstat.gov.sg/statistics/latest_data.html#12 (accessed 7 November 2013).
13. Census and Statistics Department of the HKSAR Government (2012), 'Hong Kong Population Projections 2012-2041', <http://www.statistics.gov.hk/pub/B1120015052012XXXXB0100.pdf> (accessed 7 November 2013).
14. Ministry of Trade and Industry of the Republic of Singapore, *A Sustainable Population for a Dynamic Singapore – Population White Paper*, January 2013, http://www.mti.gov.sg/MTIInsights/Documents/NPTDWP_LR.PDF (accessed 26 November 2013); Kog, Y.C. (2001), Natural resource management and environmental security in Southeast Asia : a case study of clean water supplies to Singapore, Nanyang Technological University, <http://dr.ntu.edu.sg/handle/10220/4414> (accessed 26 November 2013).
15. Chen et al. (2012), 'An Innovative Triple Water Supply System and a Novel SANI Process to Alleviate Water Shortages and Pollution Problems for Water-scarce Coastal Areas in China', Vol. 2, Issue 1, *Journal of Water Sustainability*, p. 122, <http://www.jwsonline.com/uploadpic/Magazine/ppper%20121-129per%20JWS-A-12-007.pdf> (accessed 7 November 2013).
16. ASEM Water Resource Research and Development Center (no date), 'The Republic of Singapore', <http://www.asemwater.org/AboutASEMWater/ASEMper%20Members/2011-05-19/98.html> (accessed 7 November 2013).
17. United Nations Department of Economic and Social Affairs (2012), 'Water Scarcity', <http://www.un.org/waterforlifedecade/scarcity.shtml> (accessed 7 November 2013).
18. HKSAR Government, 'Water, Power and Gas Supplies', *Hong Kong: The Facts*, July 2013, http://www.gov.hk/en/about/abouthk/factsheets/docs/wp&g_supplies.pdf (accessed 7 November 2013).
19. See pp. 16-19 of Liu (2013) in endnote 2; Ho, P.Y. (2003), *點滴話當年—香港供水一百五十年*, first edition, The Commercial Press (Chinese only).
20. Public Utilities Board of the Republic of Singapore (2012), 'Local Catchment Water', <http://www.pub.gov.sg/water/Pages/LocalCatchment.aspx> (accessed 7 November 2013).

- 7 November 2013).
21. Public Utilities Board of the Republic of Singapore (2012), 'Marina Barrage', <http://www.pub.gov.sg/Marina/Pages/3-in-1-benefits.aspx#wc> (accessed 10 November 2013).
 22. Water Supplies Department of the HKSAR Government (2013), 'Brief Introduction to Reservoirs', http://www.wsd.gov.hk/en/education/fun_of_fishing_in_hong_kong/brief_introduction_of_reservoirs/index.html (accessed 7 November 2013); Antiquities and Monuments Office of the HKSAR Government (2013), Historic Building Appraisal, http://www.amo.gov.hk/form/brief_information_grade2.pdf (accessed 7 November 2013).
 23. List of Reservoirs refers to endnote 21; Water storage capacities data before 2004 from Segal, D., *Singapore's Water Trade with Malaysia and Alternatives*, Harvard University John F. Kennedy School of Government, 30 March 2004, http://www.transboundarywaters.orst.edu/publications/abst_docs/related_research/Segal-Singapore-Malaysiapercent2004.pdf (accessed 7 November 2013); Pulau Tekong and Jurong reservoirs' capacities are estimation using the total capacity of 142 mcm before 2004 to subtract other reservoirs' capacities. Marina Barrage Reservoir's storage capacity is an estimation according to PUB's information on the current total daily water demand of Singapore 400 million gallons and PUB's statement that the Marina Barrage supplies up to 10 per cent of Singapore's water demand (see also endnote 21).
 24. It must be noted that the capacity of Singapore reservoirs is regarded as a national secret. Figures quoted in the above table are cited from academic papers and estimated from various government sources in the public domain.
 25. No official data has been released since 2004. The 2008 estimated figure is not included.
 26. See endnote 11.
 27. See endnote 12.
 28. Central Intelligence Agency of USA (2013), 'The World Factbook – Hong Kong', <https://www.cia.gov/library/publications/the-world-factbook/geos/hk.html> (accessed 9 November 2013).
 29. Ibid.
 30. See endnote 11.
 31. National Environment Agency of the Republic of Singapore (2013), 'Weather Statistics – Records of Records of Climate Station Mean & Records of Climate Station Extreme', http://app2.nea.gov.sg/redirection-page?aspxerrorpath=/weather_statistics.aspx (accessed 7 November 2013).
 32. See endnote 11.
 33. See endnote 31.
 34. See endnote 11.
 35. See endnote 31.
 36. See endnote 11.
 37. See endnote 31.
 38. In June 2013, the author contacted the Water Supplies Department of the HKSAR Government to request data on the annual amount of rainfall collected in reservoirs, the amount of water stored at the beginning of each year, annual imports of Dongjiang water and total water consumption from 1965 to present, and received a response the same month. The Department had records of annual imports of Dongjiang water since 1965, annual amount of rainfall collected in reservoirs since 1981, and amount of water stored at the beginning of each year since 1989. Amount of rainfall collected from 1965 to 1980 each year was calculated by subtracting that year's total water consumption from that year's import of Dongjiang water.
 39. See endnote 10.
 40. Harris, P. (2012), *Environmental Policy and Sustainable Development in China*, p. 16, The Policy Press; see also endnote 10.
 41. The National Economic Action Council (2003), *Water: The Singapore-Malaysia Dispute – The Facts*, <http://starstorage.blob.core.windows.net/archives/2003/7/21/nation/waterbooklet2.pdf> (accessed 12 November 2013).
 42. Public Utilities Board of the Republic of Singapore (2013), *Our Water, Our Future*, http://www.pub.gov.sg/mpublications/Documents/OurWaterOurFuture_2013.pdf (accessed 8 November 2013).
 43. See p. 15 of Liu (2013) in endnote 2.
 44. Toh, E., 'Quenching Singapore's thirst', *The Straits Times*, 3 September 2011.
 45. Liu, S., 'Hong Kong vs Singapore: the water story', *CleanBiz.Asia*, 6 September 2013, http://www.cleanbiz.asia/blogs/hong-kong-vs-singapore-water-story#.UoXZ_qxWoul (accessed 10 November 2013).
 46. See endnote 42.
 47. Singapore International Water Week (2012), 'City of Gardens and Water', <http://www.siww.com.sg/2012/city-gardens-and-water> (accessed 11 December 2013).
 48. See pp. 22-24 of Liu (2013) in endnote 2.
 49. See pp. 13-33 of Liu (2013) in endnote 2.
 50. See endnote 1.
 51. Rainfall, local yield and water from supplied from Guangdong from: Water Supplies Department of the HKSAR Government (2013), 'Miscellaneous Data', http://www.wsd.gov.hk/en/publications_and_statistics/statistics/key_facts/miscellaneous_data/index.html (accessed 7 November 2013). Seawater consumption figures from: Water Supplies Department of the HKSAR Government (no date), 'Introduction to Water Supplies Department', http://www.wsd.gov.hk/filemanager/common/digital_resources/presentation/intro_to_wsd_e.pdf (accessed 7 November 2013).
 52. See Ho (2003) in endnote 19.
 53. See Liu (2013) of endnote 2. Imported water was drawn from the data sheet of Figure 2 'Water imported from Dongjiang'; Local catchment data was drawn from the same datasheet 'Rainfall collected';

- Seawater was drawn from Table 11 'Amount of seawater supplied'.
54. See p. 3 of endnote 42. The percentage of Imported water is drawn from: Caballero-Anthony, M. & Hangzo, P.K.K., 'From water insecurity to niche water diplomacy: The Singapore experience', *NTS Insight*, November 2012, http://www.rsis.edu.sg/nts/HTML-Newsletter/Insight/pdf/NTS_Insight_nov_1201.pdf (accessed 8 November 2013). The percentage of Local catchment is then calculated using 100 per cent minus the sum of the above three percentages.
 55. Converted into US\$ from HK\$ at a rate of US\$ 1 = HK\$ 7.78. See endnote 11.
 56. Converted into US\$ from Singapore dollar (S\$) at a rate of US\$ 1 = S\$ 1.25. See Ministry of Trade and Industry of the Republic of Singapore (no date), 'Key Economic Indicators', <http://www.mti.gov.sg/ResearchRoom/Pages/default.aspx> (accessed 20 November 2013).
 57. Hong Kong Economic and Trade Office (Sydney) of the HKSAR Government (2011), 'Hong Kong Economy', <http://www.hketosydney.gov.hk/hkeconomy.php> (accessed 20 November 2013).
 58. Department of Statistics of the Republic of Singapore, 'National Accounts', November 2013, http://www.singstat.gov.sg/statistics/browse_by_theme/national_accounts.html (accessed 27 December 2013).
 59. For Hong Kong data, see endnote 61. For Singapore data, see endnote 62.
 60. See pp. 34-43 of Liu (2013) in endnote 2.
 61. Water Supplies Department of the HKSAR Government (2012), 'Securing Our Water Supplies', *Annual Report 2011/2012: Enhancing Resilience of Water Supply*, http://www.wsd.gov.hk/filemanager/common/annual_report/2011_12/pdf/07.pdf (accessed 7 November 2013).
 62. See Lee (2003) in endnote 9.
 63. Population data for 2003 to 2011 sourced from: Census and Statistics Department of the HKSAR Government, *Demographic Trends in Hong Kong 1981-2011*, December 2012, <http://www.statistics.gov.hk/pub/B1120017032012XXXXB0100.pdf> (accessed 7 November 2013). For 2012 population, see endnote 11.
 64. Population data for 2003 to 2005 from: Department of Statistics Singapore of the Republic of Singapore (no date), Singapore Residents Population 2003-2007, http://www.singstat.gov.sg/Publications/publications_and_papers/population_and_population_structure/respop.pdf (accessed 7 November 2013). Department of Statistics Singapore of the Republic of Singapore, 'Population', 30 September 2013, http://www.singstat.gov.sg/Publications/population.html#population_and_population_structure (accessed 7 November 2013).
 65. Census and Statistics Department of the HKSAR Government (2013), *Hong Kong Monthly Digest of Statistics*, years 2003 to 2012, <http://www.censtatd.gov.hk/hkstat/sub/sp50.jsp?productCode=B1010002> (accessed 13 December 2013).
 66. Department of Statistics Singapore of the Republic of Singapore (no date), 'Time Series on Per Capita GDP at Current Market Prices', https://www.google.com/url?q=http://www.singstat.gov.sg/statistics/browse_by_theme/economy/time_series/gdp.xls&sa=U&ei=NalZUprXJle_igKpvoGoAw&ved=0CAkQFjAB&client=internal-uds-cse&usq=AFQjCNF9CsX8Mew6O2IMAwrcSn9gnE6FfA (accessed 7 November 2013).
 67. Total water consumption is based on freshwater consumption plus seawater consumption, sourced from: Water Supplies Department of the HKSAR Government (no date), *Introduction to Water Supplies Department*, http://www.wsd.gov.hk/filemanager/common/digital_resources/presentation/intro_to_wsd_e.pdf (accessed 7 November 2013).
 68. Figures based on water sales in Singapore found in: Ministry of the Environment and Water Resources of the Republic of Singapore, 'Water Resource Management', 22 August 2013, <http://app.mewr.gov.sg/web/Contents/contents.aspx?ContId=682> (accessed 7 November 2013); Department of Statistics of the Republic of Singapore (2009), 'Yearbook of Statistics Singapore 2009', <http://cec.shfc.edu.cn/download/c4fbbb07-709a-4353-9057-006c594d2d37.pdf> (accessed 7 November 2013).
 69. Data derived from per capita freshwater consumption plus per capita flushing water consumption, data for years 2003 to 2007 from: Water Supplies Department of the HKSAR Government (2008), *Annual Report 2007/2008*, http://www.wsd.gov.hk/filemanager/en/share/annual_reports/rpt0708/menu.htm (accessed 14 November 2013). Data for 2007 to 2011 from: Water Supplies Department of the HKSAR Government (2012), 'Appendices and Annexes', *Annual Report 2011/2012: Enhancing Resilience of Water Supply*, http://www.wsd.gov.hk/filemanager/common/annual_report/2011_12/pdf/13.pdf (accessed 14 November 2013).
 70. Data for years 2000 to 2007 from: Public Utilities Board of the Republic of Singapore (2008), *PUB Financial Report 2007/2008*, <http://www.pub.gov.sg/publications/Lists/AnnualReport/Attachments/7/PUBper cent20ARFper cent2007-08.pdf> (accessed 14 November 2013). Data for years 2007 to 2012 from: Ministry of the Environment and Water resources of the Republic of Singapore (no date), 'Water for All', <http://app.mewr.gov.sg/web/Contents/contents.aspx?ContId=682> (accessed 14 November 2013).
 71. HKSAR Government, 'Press releases: LCQ9: Use of water resources', 9 November 2011, <http://www.info.gov.hk/gia/general/201111/09/P201111090226.htm> (accessed 11 November 2013).
 72. See endnote 17.
 73. See pp. 85 & 232 of endnote 10.
 74. Public Utilities Board of the Republic of Singapore (2013), 'Conserve', <http://www.pub.gov.sg/conserves/Pages/default.aspx> (accessed 11 November 2013).
 75. Tan, D., '8 Take Aways: 2 Degrees Celsius + Water', China Water Risk, 9 May 2012, <http://chinawaterrisk.org/resources/analysis-reviews/8-takeaways-two-degrees-celsius-water/> (accessed 11 November 2013).

76. See pp. 54-57 of Liu (2013) in endnote 2.
77. 'A New Desalination Plant in Hong Kong', HK Magazine, 27 October 2011, <http://hk.asia-city.com/health/article/new-desalination-plant-hong-kong> (accessed 11 November 2013).
78. Water Supplies Department of the HKSAR Government (2013), 'Water and Sewage Tariffs', http://www.wsd.gov.hk/en/customer_services_and_water_bills/water_and_sewage_tariff/water_and_sewage_tariff/index.html (accessed 7 November 2013).
79. See pp. 89-98 of endnote 10.
80. Genasci, L., 'Hong Kong's Water Supply Far from Secure', genascihk.com, 13 May 2012, <http://genascihk.com/2012/05/13/hk-water/> (accessed 11 November 2013).
81. Public Utilities Board of the Republic of Singapore (2013), 'Water Pricing in Singapore', <http://www.pub.gov.sg/general/Pages/WaterTariff.aspx> (accessed 7 November 2013).
82. Ibid.
83. Tartayada, C., & Joshi, Y.K., 'Water Demand Management in Singapore: Involving the Public', 2 March 2013, Springer, <http://www.thirdworldcentre.org/watdemsingapore.pdf> (accessed 12 November 2013).
84. Upson, S., 'Singapore's Water Cycle Wizardry', IEEE Spectrum, 28 May 2010, <http://spectrum.ieee.org/energy/environment/singapores-water-cycle-wizardry> (accessed 12 November 2013).
85. Chiplunker, A., Seethram, K., Tan, C.K. (2012), *Good Practices in Urban Water Management*, Asian Development Bank, National University of Singapore, <http://reliefweb.int/sites/reliefweb.int/files/resources/good-practices-urban-water-management.pdf> (accessed 12 November 2013).
86. See pp. 89-98 of endnote 10.
87. See endnote 3.
88. Water charges from: Water Supplies Department of the HKSAR Government (no date), 'Comparison of water charges for domestic accounts in Hong Kong with other major cities', http://www.wsd.gov.hk/filemanager/en/content_765/water_charges_comparison.pdf (accessed 7 November 2013). GDP data from: Istrate, E. & Nadeau, C.A., 'Global MetroMonitor,' Brookings Research, 30 November 2012, <http://www.brookings.edu/research/interactives/global-metro-monitor-3> (accessed 19 December 2013).
89. Table of years 1960 to 1989 sourced from: Lee, W. et al., *Achieving Sustainable Clean Water Supply in South China*, p. 7, March 2005, Civic Exchange, http://www.civic-exchange.org/wp/wp-content/uploads/2010/12/200503_water.pdf (accessed 7 November 2013). 1998 Loan Agreement data from: Audit Commission of the HKSAR Government, 'Water Purchased from Guangdong Province', 11 October 1999, http://www.aud.gov.hk/pdf_e/e33ch12.pdf (accessed 7 November 2013).
90. See p. 22 of Liu (2013) in endnote 2.
91. Water Supplies Department of HKSAR Government (2012), 'Water from Dongjiang to Guangdong', http://www.wsd.gov.hk/en/water_resources/raw_water_sources/water_sources_in_hong_kong/water_from_dongjiang_at_guangdong/index.html (accessed 12 November 2013).
92. '揭秘周恩來總理親自批准興建的香港“生命之水”', Chinanews, 12 June 2012, <http://www.chinanews.com/ga/2012/06-12/3956023.shtml> (accessed 30 June 2013). (Chinese only)
93. The 30 years following the establishment of New China were fraught with difficulties. In particular: the western powers led by the United States imposed a trade embargo on China after China aided North Korea in the Korean War (see '霍英東談—抗美援朝期間支持新中國建設的幾段往事', *人民政協報*, 3 September 2009, http://epaper.rmzxb.com.cn/2009/20090903/t20090903_273565.htm, accessed 13 December 2013, Chinese only); by 1956, nearly all foreign investments and foreign companies had departed China (see '毛澤東時代的中英經貿關係', *中共中央黨校博士學位論文*, 1995, Chinese only); the Great Leap Forward from 1958-60 (see '“大躍進”運動', *Xinhuanet*, 20 January 2003, http://big5.xinhuanet.com/gate/big5/news.xinhuanet.com/ziliao/2003-01/20/content_698127.htm, accessed 27 June 2013, Chinese only); the breakdown of Sino-Soviet relations in 1960 which resulted in skyrocketing foreign debt; the Three Bitter Years of 1960-62 (see '中共黨史首次證實1960年人口銳減1千萬', *Netease*, re-directed from *新京報*, 21 February 2011, <http://news.163.com/11/0221/02/6TC0798900014AED.html>, accessed 26 November 2013, Chinese only); the Cultural Revolution of 1966-76 (see '文化大革命', *Xinhuanet*, 20 January 2003, http://news.xinhuanet.com/ziliao/2003-01/20/content_697889.htm, accessed 27 June 2013, Chinese only); and the generous amounts of foreign aid granted by China when it could scarcely afford to do so (see Yun Shu (2009), '糾正與國力不符的對外援助—中國外援往事', re-directed from *同舟共進*, 2009, Vol. 1, Universities Service Centre for China Studies, The Chinese University of Hong Kong, <http://www.usc.cuhk.edu.hk/PaperCollection/Details.aspx?id=7198>, accessed 27 June 2013, Chinese only).
94. 歐陽湘, 唐富滿, '特載: 從內地對港澳地區的出口供應看中國共產黨的港澳工作方針(1949-1978)' (Part 1 and Part 2), *新華澳報*, 10 and 17 January 2013, <http://www.waou.com.mo/detail.asp?id=66617> (Part 1) and <http://www.waou.com.mo/detail.asp?id=66785> (Part 2), accessed 22 July 2013 (Chinese only).
95. See p. 23 of Liu (2013) in endnote 2.
96. '東深供水改造工程', *people.com.cn*, 30 January 2011, <http://scitech.people.com.cn/GB/25509/56813/213022/213263/13850493.html> (accessed 2 July 2013). (Chinese Only)
97. Ibid.
98. Audit Commission of the HKSAR Government, 'Water Purchased from Guangdong Province', 11 October 1999, http://www.aud.gov.hk/pdf_e/e33ch12.pdf (accessed 7 November 2013).
99. See p. 29 of Liu (2013) in endnote 2.

100. Legislative Council Panel on Development of the HKSAR Government (2013), 'Background brief on the supply and quality of Dongjiang water', LC Paper No. CB(1)734/12-13(04), <http://www.legco.gov.hk/yr12-13/english/panels/dev/papers/dev0326cb1-734-4-e.pdf> (accessed 12 November 2013).
101. Ibid.
102. See endnote 98.
103. See endnote 77.
104. See endnote 91.
105. 'Interview with Bobby Ng (WSD) – The Future of Hong Kong Water', China Water Risk, 11 September 2012, <http://chinawaterrisk.org/interviews/the-future-of-hong-kong-water/> (accessed 12 November 2013).
106. See pp. 39-41 of Liu (2012) in endnote 2.
107. Breakdown of water agreements found in: Chew, V. (2009), 'Singapore – Malaysia water agreements', Singapore Infopedia, http://infopedia.nl.sg/articles/SIP_1533_2009-06-23.html (accessed 8 November 2013) and see also pp.169-171 of endnote 10.
108. See Chew (2009) in endnote 107.
109. Ibid.
110. See p. 36 of endnote 10.
111. See Chew (2009) in endnote 107.
112. Ibid.
113. Yang, L., Zhang, C., Ngaruiya, G.W. (2012), 'Water Supply Risks and Urban Responses under a Changing Climate: A Case Study of Hong Kong', *Pacific Geographies*, http://www.pacific-news.de/pg39/pg39_Liangper cent20Yang_et_al.pdf (accessed 12 November 2013).
114. Choong, K.Y., *Natural Resource Management and Environmental Security in Southeast Asia: Case Study of Clean Water Supplies in Singapore*, May 2001, Institute of Defence and Securities Studies, <http://www.rsis.edu.sg/publications/WorkingPapers/WP15.pdf> (accessed 12 November 2013).
115. See Liu (2013) in endnote 2.
116. Wang, X.W., & Lo, J. (2003), 'Beijing sides with Hong Kong on water deal', *South China Morning Post*, 13 August 2003, <http://www.scmp.com/article/424656/beijing-sides-hk-water-deal> (accessed 12 November 2013).
117. See endnote 98.
118. Ibid.
119. See pp. 9-16 of Liu (2012) in endnote 2.
120. National Development and Reform Commission of People's Republic of China, *珠江三角洲地區改革發展規劃綱要 (2008-2020)*, December 2008, <http://www.gdep.gov.cn/hbgh/ghjh/ghjh/201008/P020100804604719020540.pdf> (accessed 8 July 2013). (Chinese only)
121. '水量分配方案是取水紅綫', *Nanfong Daily*, 11 December 2008, http://epaper.nfdaily.cn/html/2008-12/11/content_6708769.htm (accessed 2 March 2012). (Chinese only)
122. Kwan, C.C., '反省競爭排名降攻教育降成本', *Hong Kong Economic Times*, 19 June 2013, <http://www.hket.com/eti/article/540a9a64-7c50-4cd1-a1e0-7bfa9ba4bd1e-045646> (accessed 8 July 2013). (Chinese only)
123. For example, Lu quoted in: Cheung, G. & Lau, S., 'Love China or Leave it', *South China Morning Post*, 1 November 2012, <http://www.scmp.com/news/hong-kong/article/1074148/love-china-or-lump-it-lu-ping-tells-would-be-secessionists?page=all> (accessed 12 November 2013).
124. Long, J., 'Desecuritizing the Water Issue in Singapore-Malaysia Relations', *Contemporary Southeast Asian*, Vol. 23, No. 3, p. 506, December 2001, Institute of Southeast Asian Studies (ISEAS).
125. Ibid.
126. See p. 18 of endnote 10.
127. See pp. 11-12 of endnote 10.
128. See p. 2 of Lee (2003) in endnote 9.
129. See Lee (2003) in endnote 9.
130. Ibid.
131. See Segal (2004) in endnote 23.
132. See p. 2 of Lee (2003) in endnote 9.
133. See Lee (2003) of endnote 9.
134. Kolesnikov, S., 'Malaysia-Singapore water issue boiling', Singapore Window, 28 January 2002, <http://www.singapore-window.org/sw02/020128up.htm> (accessed 12 November 2013).
135. See Segal (2004) in endnote 23.
136. See pp. 10-12 of Lee (2003) in endnote 9.
137. See Segal (2004) in endnote 23.
138. Ministry of Information of the Republic of Singapore (2003), *Water Talks? If Only it Could*, January, Communications and Arts.
139. See endnote 41.
140. Kuppusamy, B., 'Malaysia-Singapore: Political Storm Over Water Comes, Goes', Inter Press Service News Agency, 30 July 2003, <http://www.ipsnews.net/2003/07/malaysia-singapore-political-storm-over-water-comes-goes/> (accessed 12 November 2013).
141. See pp. 12-15 of Lee (2003) in endnote 9.
142. 'Introducing newwater', *The Economist*, 9 January 2003, <http://www.economist.com/node/1527091> (accessed 12 November 2013).
143. See Segal (2004) of endnote 23.
144. See endnote 140.
145. See endnote 41.
146. See Segal (2004) of endnote 23.
147. HKSAR Government (2013), 'The Organisation Chart of the Government of the Hong Kong Special Administrative Region', <http://www.gov.hk/en/about/govdirectory/govchart/> (accessed 10 November 2013).
148. Ministry of the Environment and Water Resources of the Republic of Singapore (2013), 'Statutory Boards PUB', <http://app.mewr.gov.sg/web/Contents/contents.aspx?ContId=1589> (accessed 10 November 2013).

149. Government of the Republic of Singapore (2013), 'Cabinet Appointments', <http://www.cabinet.gov.sg/content/cabinet/appointments.html> (accessed 10 December 2013); The Government of the Republic of Singapore (2013), 'Directory', http://app.sgdi.gov.sg/listing.asp?agency_subtype=dept&agency_id=0000000004 (accessed 10 December 2013); Ministry of Environment and Water Resources of the Republic of Singapore (2013), 'About Us', <http://app.mewr.gov.sg/web/Contents/Contents.aspx?Id=189> (accessed 10 December 2013); Public Utilities Board of the Republic of Singapore (2013), 'Organisation Chart', <http://www.pub.gov.sg/about/Pages/OrganisationChartImage.aspx> (accessed 10 December 2013).
150. Water Supplies Department of the HKSAR Government (2008), *Total Water Management*, <http://www.wsd.gov.hk/filemanager/en/share/pdf/TWM.pdf> (accessed 12 November 2013).
151. Ibid.
152. Ibid.
153. Fresh water resources data from Water Supplies Department of the HKSAR Government (2013), 'Miscellaneous Data', http://www.wsd.gov.hk/en/publications_and_statistics/statistics/key_facts/miscellaneous_data/index.html (accessed 7 November 2013). Seawater data from Drainage Services Department HKSAR Government (2013), 2011-12 Annual Report, http://www.dsd.gov.hk/EN/Files/annual_reports/1112/index.html (accessed 10 November 2013).
154. The proportion of 2020 fresh water recourses is projected based on 2012 data. The proportion of desalinated water from HKSAR Government (2013), 'Desalination Plant Possible in 2020', http://www.news.gov.hk/en/categories/infrastructure/html/2013/05/20130522_182816.shtml (accessed 8 November 2013).
155. Newater data retrieved from: Public Utilities Board of the Republic of Singapore (2013), 'NEWater', <http://www.pub.gov.sg/water/newater/Pages/default.aspx> (accessed 7 November 2013). Desalinated water data retrieved from: Public Utilities Board of the Republic of Singapore (2013), 'Desalinated Water', <http://www.pub.gov.sg/WATER/Pages/DesalinatedWater.aspx> (accessed 7 November 2013). Data for imported water percentage found in: Caballero-Anthony & Hangzo (2012) of endnote 54. Targets for local catchment and imported water estimated based on percentage targets given for Newater and desalinated water.
156. Public Utilities Board of the Republic of Singapore (2013), 'Four National Taps Provide Water for All', <http://www.pub.gov.sg/water/Pages/default.aspx> (accessed 12 November 2013).
157. See endnote 155.
158. See p. 3 of endnote 42.
159. HKSAR Government (2013), 'Press releases: LCQ20: Fresh Water Supply', <http://www.info.gov.hk/gia/general/201302/27/P201302270327.htm> (accessed 12 November 2013).
160. See endnote 105.
161. See endnote 100.
162. See p. 2 of Lee (2003) in endnote 9.
163. See Caballero-Anthony & Hangzo (2012) in endnote 54.
164. State Water Control Board (2008), 'Water Reclamation and Water Reuse Regulations', http://www.fairfaxcounty.gov/dpwes/construction/water_reuse/waterreclamation.pdf (accessed 14 November 2013).
165. Lemonick, S. (2013), 'Drinking toilet water: The science and (psychology) of wastewater recycling', *Earth Magazine*, <http://www.earthmagazine.org/article/drinking-toilet-water-science-and-psychology-wastewater-recycling> (accessed 13 November 2013).
166. HKSAR Government (2013), 'Use of Reclaimed Water', <http://www.gov.hk/en/residents/environment/water/userclaimedwater.htm> (accessed 13 November 2013).
167. Legislative Council Panel on Development of the HKSAR Government (2010), 'Progress of Implementation of Total Water Management', LC Paper No. CB(1)1919/09-10(03), p. 9, <http://www.legco.gov.hk/yr09-10/english/panels/dev/papers/dev0525cb1-1919-3-e.pdf> (accessed 14 November 2013).
168. See endnote 166.
169. Water Supplies Department of the HKSAR Government, 'Examination of Estimates of Expenditure 2012-2013, Controlling Officers Written Reply to Initial Questions', DEVB(W)076, April 2013, http://www.wsd.gov.hk/filemanager/en/share/pdf/sfc_e_2013-14.pdf (accessed 14 November 2013).
170. HKSAR Government, 'Press releases: LCQ14: Seawater Desalination Technology', 22 May 2013, <http://www.info.gov.hk/gia/general/201305/22/P201305220523.htm> (accessed 14 November 2013).
171. Tortajada, C. (2006), *Singapore: An Exemplary Case for Urban Water Management*, http://hdr.undp.org/en/reports/global/hdr2006/papers/cecilia_tortajada_singapore_casestudy.pdf (accessed 14 November 2013).
172. Public Utilities Board of the Republic of Singapore (2010), 'The Newater Treatment Process', http://www.pub.gov.sg/LongTermWaterPlans/wfall_3rdtapa.html (accessed 14 November 2013).
173. Public Utilities Board of the Republic of Singapore (2013), 'NEWater', <http://www.pub.gov.sg/water/newater/Pages/default.aspx> (accessed 7 November 2013).
174. See p. 233 of endnote 10.
175. Coffey, M. (no date), 'Amiad's Pre-Treatment Systems Used in NEWater Factories', IDS-Water-White Paper, http://www.idswater.com/Common/Paper/Paper_266/NEWATER_Claritypercent20Paperpercent20html.htm (accessed 19 December 2013).
176. See endnote 83.
177. Holbrook, E., (2009) 'Water, Water Everywhere...But Not Enough For Business', *Risk Management*, <http://cf.rims.org/Magazine/PrintTemplate.cfm?AID=3920> (accessed 14 November 2013).

178. See endnote 84.
179. See endnote 172.
180. See endnote 84.
181. See pp. 120-121 of endnote 10.
182. See endnote 156.
183. See pp. 232-233 of endnote 10.
184. Ibid.
185. Ibid.
186. Public Utilities Board of the Republic of Singapore (2013), 'Treatment and Recovery of RO Brine for Higher Recovery in NEWater Factories', http://www.pub.gov.sg/research/Key_Projects/Pages/UserWater4.aspx (accessed 14 November 2013).
187. International Desalination Association (2012), 'Desalination Overview', <http://www.idadesal.org/desalination-101/desalination-overview/> (accessed 12 November 2013).
188. See p. 2 of Lee (2003) in endnote 9.
189. Global Water Intelligence, *Desalination Gets a Fresh Start in Hong Kong*, vol. 13, issue 7, July 2012, <http://www.globalwaterintel.com/archive/13/7/general/desal-gets-fresh-start-hong-kong.html> (accessed 12 November 2013); Le Clue, S., 'Hong Kong: Stepping Up Water Security?', *China Water Risk*, 11 September 2012, <http://chinawaterrisk.org/resources/analysis-reviews/hong-kong-stepping-up-water-security/> (accessed 12 November 2013).
190. Public Utilities Board of the Republic of Singapore (2013), 'Desalinated Water', <http://www.pub.gov.sg/WATER/Pages/DesalinatedWater.aspx> (accessed 7 November 2013).
191. Ibid.
192. See pp. 233-234 of endnote 10.
193. Public Utilities Board of the Republic of Singapore (2010), 'Lowering Energy Consumption in Desalination', http://www.pub.gov.sg/LongTermWaterPlans/pipeline_LowerEgy.html (accessed 12 November 2013).
194. See p. 233 of endnote 10.
195. See endnote 175.
196. *Advancing the Chemical Science*, 'Keeping the Tap On', February 2012, <http://www.rsc.org/chemistryworld/Issues/2012/February/desalination-keeping-tap-on.asp> (accessed 12 November 2013).
197. Water-technology.net (2012), 'Tuas Seawater Desalination Plant- Singapore', <http://www.water-technology.net/projects/tuas-seawater-desalination/> (accessed 12 November 2013).
198. See pp. 232-233 of endnote 10.
199. See endnote 100.
200. See endnote 15.
201. Chen G.H., 'A Novel Total Water Management System for Energy Saving and Resource Recovery in Coastal Cities', Hong Kong Baptist University, 8 December 2011, http://arcpe.hkbu.edu.hk/en/events_detail.php?id=23 (accessed 14 November 2013).
202. Ibid.
203. About SANI Process: Conventional biological wastewater treatment processes make use of microbes to convert pollutants in water into carbon dioxide in order to sanitise wastewater. Since microbes grow rapidly, conventional processes produce large amounts of microbes which become sludge. The SANI Process technology, on the other hand, makes use of a common microbe called Sulphate-reducing bacteria, which makes use of Sulphate in seawater as the medium to oxidise and eliminate pollutants. Since the microbe boasts high efficiency and low growth rate, it minimises sludge production by 90 per cent, hence its naming as SANI Process, meaning "sludge-killing" in Chinese.
204. The Hong Kong University of Science and Technology, 'Press Release: HKUST Kicks off Hong Kong's Novel Sewage Treatment Technology Trial Run, securing the Biggest Sponsorship with Five International Awards', 13 December 2012, http://www.ust.hk/eng/news/press_20121213-1005.html (accessed 10 November 2013).
205. Water Supplies Department of the HKSAR Government (2013), 'Miscellaneous Data', http://www.wsd.gov.hk/en/publications_and_statistics/statistics/key_facts/miscellaneous_data/index.html (accessed 7 November 2013).
206. Leung et al. (2012), 'Integration of seawater and grey water reuse to maximise alternative water resource for coastal areas: the case of the Hong Kong International Airport', *Water Science Technology*, 65(3), 410-417.
207. See pp. 121-129 of endnote 15.
208. Ng, W. (2006), 'The Environmental Sustainability of Grey Water Recycling in Hong Kong Housing', University of Hong Kong, <http://hdl.handle.net/10722/131569> (accessed 14 November 2013).
209. Ibid.
210. Public Utilities Board of the Republic of Singapore (2013), 'Variable Salinity Plant', http://www.pub.gov.sg/research/Key_Projects/Pages/Membrane1.aspx (accessed 14 November 2013).
211. See endnote 85.
212. See p. 18 of endnote 150.
213. Legislative Council Panel on Development of the HKSAR Government (2012), 'Follow up action to meeting on 17 April 2012, 9345WF – Planning and investigation study of desalination plant at Tseung Kwan O', LC Paper No. CB(1) 1795/11-12(01), <http://www.legco.gov.hk/yr11-12/english/panels/dev/papers/dev0417cb1-1795-1-e.pdf> (accessed 14 November 2013).
214. Public Utilities Board of the Republic of Singapore (2010), 'Ready for the Future', http://www.pub.gov.sg/longtermwaterplans/wfall_rotf_wts.html (accessed 14 November 2013).
215. Ibid.
216. See p. 147 of endnote 10.
217. See pp. 35-59 of endnote 10.
218. Grieve, A., 'Breaking Hong Kong's Addiction to Imported Water', 15 December 2011, <http://>

- thoughts.arup.com/post/mobiledetails/153/...- [trackback]- (accessed 14 November 2013).
219. See endnote 150.
220. See endnote 169.
221. Public Utilities Board of the Republic of Singapore (no date), 'Drainage', <http://www.pub.gov.sg/general/drainageworks/pages/default.aspx?print2=yes> (accessed 14 November 2013).
222. See p. 58 of endnote 10.
223. See pp. 35-59 of endnote 10.
224. Educational visits to water treatment works: Water Supplies Department of the HKSAR Government (2013), 'Educational visits to water treatment works by schools or groups', http://www.wsd.gov.hk/en/education/educational_visits_to_water_treatment_works/index.html (accessed 14 November 2013). Roving Exhibitions: Water Supplies Department of the HKSAR Government (2013), 'Roving Exhibitions', http://www.wsd.gov.hk/en/education/roving_exhibition/index.html (accessed 14 November 2013). Water resource education centre: Water Supplies Department of the HKSAR Government (2013), 'Water Resources Education Centre', http://www.wsd.gov.hk/en/education/water_resources_education_centre/index.html (accessed 14 November 2013).
225. See pp. 118-119 of endnote 10.
226. See endnote 85.
227. Audit Commission of the HKSAR Government, 'Water Purchased from Guangdong Province', p. 47, 11 October 1999, http://www.aud.gov.hk/pdf_e/e33ch12.pdf (accessed 7 November 2013).
228. See p. 2 of Lee (2003) in endnote 9.
229. See p. 16 of Harris (2012) in endnote 40; see also p. 163 of endnote 10.
230. 'Water self-sufficiency a strategic priority: PM Lee', *The Business Times*, 6 July 2011, <http://www.asiaone.com/News/AsiaOne+News/Singapore/Story/A1Story20110706-287872.html> (accessed 12 November 2013).
231. 'Singapore to Meet Water Targets Before Deadline: Southeast Asia', *Bloomberg*, 30 July 2012, <http://www.Bloomberg.com/news/2012-07-29/singapore-to-meet-water-target-before-deadline-southeast-asia.html> (accessed 12 November 2013).
232. Tortajada, C., 'Water Management in Singapore', *Water Resources Development*, vol.22, No.2, pp. 227-240, June 2006, http://www.kysq.org/docs/Tortajada_2006.pdf (accessed 14 November 2013).
233. Embassy of Israel in Singapore, 'Market Report, Water/Singapore', 30 July 2007, <https://www.google.com/url?q=http://www.moital.gov.il/NR/rdonlyres/BFBADC38-7A0C-4FE8-94D3-2B806DADE98B/0/SingaporeWaterMarketReportonlineversion.doc&sa=U&ei=gvCEUoXoOciV0AXj2oCADA&ved=0CAcQFjAA&client=internal-uds-cse&usg=AFQjCNELzuPQ5EYEZfq6JSuH8whimY7Bng> (accessed 14 November 2013).
234. Economic Development Board of the Republic of Singapore (2013), 'Environment and Water', <http://www.edb.gov.sg/content/edb/en/industries/industries/environment-and-water.html> (accessed 10 November 2013).
235. See endnote 84.
236. US Energy Information Administration (2013) 'Singapore', <http://www.eia.gov/countries/cab.cfm?fips=SN> (accessed 14 November 2013).
237. 'Singapore's next challenge: 'Treating more seawater with less energy'', *The Straits Times*, 23 March 2012, <http://wildsingaporenews.blogspot.hk/2013/03/spores-next-challenge-treating-more.html#U1Wf5LfAgN> (accessed 14 November 2013).
238. Energy Market Authority of the Republic of Singapore, 'Media Releases: LNG Terminal will Diversify Energy Sources and Enhance Singapore's Energy Security', 13 February 2012, <http://www.ema.gov.sg/news/view/301> (accessed 14 November 2013).
239. See endnote 84.
240. 'Singapore to Focus on Water-Energy Nexus', *Bloomberg*, 21 January 2013, http://www.Bloombergbriefs.com/files/CleanEnergyCarbonP1_012113.pdf (accessed 10 November 2013).
241. According to Article 9 of The Constitution of PRC, all mineral resources, waters, forests, mountains, grassland, unreclaimed land, beaches and other natural resources are owned by the state, that is, by the whole people, with the exception of the forests, mountains, grasslands, unreclaimed land and beaches that are owned by collective in accordance with the law. See the Central People's Government of the People's Republic of China (no date), '中華人民共和國憲法', http://www.gov.cn/gongbao/content/2004/content_62714.htm (accessed 10 November 2013). (Chinese only)
242. See endnote 119.
243. During the 2009 water shortages in Mainland China, there was strong public opinion in Hong Kong for the city to adopt a "good neighbour policy" and draw on its own water supplies before using Guangdong's. However, the official line from Guangdong was that, while they appreciated the gesture, water imports to Hong Kong would continue as normal. This has led to some holding the view that the Central Government was more concerned about the substantial financial sum that Hong Kong pays for its water and that it wanted to ensure that it would continue to do so. See Consulate General Hong Kong, 'Hong Kong Water Security: Reducing Dependence on Guangdong', Wikileaks, 26 October 2010, <http://wikileaks.org/cable/2010/01/10HONGKONG146.html> (accessed 14 November 2013).
244. See p. 163 of Harris (2012) in endnote 40; see p. 13 of endnote 113.
245. Peart, M.C. (2004), 'Water Supply and the Development of Hong Kong', p. 25, Hong Kong University, <http://hub.hku.hk/handle/10722/159123> (accessed 14 November 2013).
246. See p. 163 of Harris (2012) in endnote 40.
247. Ibid.
248. See pp. 106 & 167 of endnote 10.

249. HKSAR Government, 'Press releases: LCQ17: Total Water Management Strategy and related measures', 17 April 2013, <http://www.info.gov.hk/gia/general/201304/17/P201304170456.htm> (accessed 10 November 2013).
250. Water Supplies Department of the HKSAR Government (2013), 'Examination of Estimates of Expenditure 2012-2013 & 2013-2014, Controlling Officers Written Reply to Initial Questions, DEVB(W)076', year 2012 to 2013 & 2013 to 2014, http://www.wsd.gov.hk/filemanager/en/share/pdf/sfc_e_2012-13.pdf & http://www.wsd.gov.hk/filemanager/en/share/pdf/sfc_e_2013-14.pdf (accessed 8 November 2013); HKSAR Government, 'Press releases: LCQ14: Seawater Desalination Technology', 22 May 2013, <http://www.info.gov.hk/gia/general/201305/22/P201305220523.htm> (accessed 8 November 2013).
251. See Lee (2003) in endnote 9.
252. Swatuk, L. (2008), 'A Political Economy of Water in Southern Africa', *Water Alternatives* 1(1): 24-47, University of Waterloo, Canada, <http://www.water-alternatives.org> (accessed 20 November 2013).
253. Dongjiang River Basin Management Bureau, '東江流域水資源情況', 5 December 2007, http://www.djriver.cn/News_View.asp?NewsID=42 (accessed 10 November 2013). (Chinese only)
254. Legislative Council Panel on Development of the HKSAR Government (2011), 'Minutes of meeting', LC Paper No. CB(1)600/11-12, <http://www.legco.gov.hk/yr11-12/english/panels/dev/minutes/dev20111025.pdf> (accessed 15 November 2013).
255. Ibid.
256. 'The coming water wars', *The Washington Times*, 8 October 2013, <http://www.washingtontimes.com/news/2013/oct/8/the-coming-water-wars/?page=all> (accessed 15 November 2013).
257. Calculated by Su Liu from data provided in the 2000 to 2012 Annual Reports of the Water Supplies Department.
258. Liu, S., 'Giant on the edge of a precipice: the PRD by 2020', *CleanBiz.Asia*, 1 November 2012, <http://www.cleanbiz.asia/blogs/giant-edge-precipice-prd-2020> (accessed 9 November 2013).
259. See endnote 80.
260. Water Supplies Department of HKSAR Government (2012), 'Director's Statement', *Annual Report 2011/12*, pp. 11-12, http://www.wsd.gov.hk/filemanager/common/annual_report/2011_12/pdf/05.pdf (accessed 14 November 2013).
261. Ibid.
262. Council for Sustainable Development of the HKSAR Government (2012), *Total Water Management*, SDC Paper No. 03/12, <http://www.susdev.gov.hk/html/en/council/Paper03-12e.pdf> (accessed 14 November 2013).
263. '水塘滿 8年倒水值11億 今年排水接近海水化淡廠年產量', *Mingpao*, 25 November 2013, http://premium.mingpao.com/cfm/mem_Login1.cfm?SuccessUrl=percent2Fcfmpercent2FContentpercent5FNewspercent2Ecfmpercent3FChannelpercent3Dgbpercent26Pathpercent3D67237957502percent2Fgba1percent5Ferpercent2Ecfm (accessed 26 November 2013). (Chinese only)
264. See endnote 249.
265. Drainage Services Department of the HKSAR Government, *Drainage Master Planning*, 26 August 2013, http://www.dsd.gov.hk/EN/Flood_Prevention/Long_Term_Improvement_Measures/index.html (accessed 26 November 2013).
266. See endnote 42.
267. See p. 29 of endnote 61.
268. Television Broadcasts Limited (2013), '新聞透視—飲水思危', broadcast date: 14 November 2013, <http://programme.tvb.com/news/newsmagazine/episode/20131114/> (accessed 20 November 2013).
269. Innovation and Technology Commission of the HKSAR Government (2013), 'Our Mission', <http://www.itc.gov.hk/en/about/mission.htm> (accessed 24 December 2013).
270. Innovation and Technology Commission of the HKSAR Government (2013), 'About Innovation and Technology Fund', <http://www.itf.gov.hk/l-eng/about.asp> (accessed 15 November 2013).
271. Liu calculated according to data retrieved from ITC's statistic page: 'Innovation and Technology Fund Distribution of Approved Projects among Different Industrial Sectors', <http://www.itf.gov.hk/l-eng/StatView104.asp> (accessed 15 November 2013).
272. See endnote 204.
273. See endnote 271.
274. Nakamura, T. (2011), *Living on the Edge: Hilltop-to-Ocean (H2O) Management in Coastal Cities*, UNEP, http://www.worldwaterweek.org/documents/WWW_PDF/2011/Wednesday/T4/Living-on-the-Edge-Management-in-Coastal-Cities/Living-on-the-edge-Hilltops-2-Oceans.pdf (accessed 16 November, 2013).
275. The Central People's Government of the People's Republic Of China (2010), '國家人口計生委關於加強泛珠三角地區人口和計劃生育區域協作的意見, 國發(2010)41號', http://www.gov.cn/gzdt/2010-07/12/content_1651891.htm (accessed 26 November 2013). (Chinese only)
276. According to the definition from China Marine Statistical Yearbook, "coastal city" refers to municipal city or prefecture (including all districts, counties, and county-level cities) that has coast line. Hudongbaike (no date), '沿海城市', Baike.com, <http://www.baike.com/wiki/percentE6percentB2percentBFpercentE6percentB5percentB7percentE5percent9Fpercent8EpercentE5percentB8percent82> (accessed 27 December 2013).
277. Zhuhai, Shenzhen, Guangzhou, Jiangmen, Zhongshan, Huizhou, Hong Kong and Macao. State Bureau of Oceanic Administration (2012), 'Population of Coastal Cities, 2010', Chapter 10 to 17, *China Marine Statistical Yearbook 2012*, pp. 242-244, China Ocean Press.
278. People's Government of Guangdong Province (2011), '廣東概況 — 珠江三角洲地區', <http://www.gd.gov.cn/govinc/nj2010/01qsgk/010202.htm> (accessed 26 November 2013). (Chinese only)

279. Summing up the population of the cities of that year. World Health Organization (2010), 'Macao(China)', <http://www.wpro.who.int/countries/mac/en/> (accessed 28 November 2013); HKSAR Government (2013), 'Hong Kong: The Facts', <http://www.gov.hk/en/about/abouthk/factsheets/docs/population.pdf> (accessed 28 November 2013); see also endnote 277.
280. National Bureau of Statistics of China, '2010年第六次全國人口普查主要數據公報(第1號)', 28 April 2011, http://www.stats.gov.cn/tjfx/jdfx/t20110428_402722253.htm (accessed 26 November 2013). (Chinese only)
281. See endnote 277.
282. Bureau of Statistics of Guangdong Province (2013), 'Permanent Population at the Year-End by City', Section 4-5, *Guangdong Statistical Yearbook 2013*, pp. 103, China Statistics Press.
283. See endnote 277.
284. See endnote 282.
285. See endnote 277.
286. '中國設市城市數量達657個', Xinhuanet, 16 June 2011, http://news.xinhuanet.com/local/2011-06/16/c_121545801.htm (accessed 26 November 2013). (Chinese only)
287. See endnote 277.
288. See endnote 280.
289. Loosdrecht, M.V. et al., 'A source for toilet flushing and for cooling, sewage treatment benefits, and phosphorus recovery: direct use of seawater in an age of rapid urbanization', *WATER21*, pp. 17-18, October 2012.
290. World Bank (2009), *Addressing China's Water Scarcity. Recommendations for Selected Water Resource Management Issues*, The World Bank, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/01/14/000333037_20090114011126/Rendered/PDF/471110PUB0CHA0101OFFICIALOUSEOONLY1.pdf (accessed 26 November 2013).
291. See endnote 289.
292. Ibid.
293. The State Council of the People's Republic of China (2013), '國務院辦公廳關於做好城市排水防澇設施建設工作的通知', 國辦發(2013)23號, http://www.gov.cn/zwqk/2013-04/01/content_2367368.htm (accessed 26 November 2013).
294. Organisation for Economic Co-operation and Development (2009), *Alternative Ways of Providing Water Emerging Options and Their Policy Implications*, <http://www.oecd.org/env/resources/42349741.pdf> (accessed 26 November 2013).
295. See endnote 206.
296. Laughlin, J. (2013), 'Water Market Continues Growth Despite Global Recession', *WaterWorld*, <http://www.waterworld.com/articles/wwi/print/volume-24/issue-6/regulars/perspective/water-market-continues.html> (accessed 30 November 2013).
297. Ibid.
298. '李克強簽署《城鎮排水與污水處理條例》', *Asia Pacific Daily*, re-direct from Xinhuanet, 16 October 2013, <http://www.apdnews.com/news/38312.html> (accessed 30 November 2013). (Chinese only)
299. For example, Macau has set a goal to supply 10 per cent of its consumption from reclamation by 2022 (see 澳門特別行政區推動構建節水型社會工作小組 (2013), *澳門再生水發展規劃(2013-2022)諮詢文本*, p.8, <http://www.marine.gov.mo/waterconservation/pdfs/recycledWaterPlan.pdf>, accessed 26 November 2013, Chinese only). Shenzhen's use of reclaimed water has progressed rapidly – 35 per cent of consumption is reclaimed, an annual total of 646 million m³. Beijing's reclaimed water utilisation rate is 50 per cent, Tianjin is 30 per cent, and Qingdao's is 25 per cent ('深圳再生水年利用量已達6.46億立方米', *sznews.com*, 11 May 2013, http://www.sznews.com/news/content/2013-05/11/content_8037251.html, accessed 2 January 2014, Chinese only).
300. '中國5,000億污水處理投資打水80per cent污泥未處理', *Tencent Finance*, 22 July 2013, http://finance.qq.com/a/20130722/016661_all.htm (accessed 26 November 2013).
301. 'ADB Lends China \$240 Million for Wastewater Reuse', *Singapore International Water Week*, 21 November 2013, <http://www.siww.com.sg/ind240-million-wastewater-reuse> (accessed 26 November 2013).
302. Economic Development Board of the Republic of Singapore, 27 May 2013.
303. Drainage Services Department of the HKSAR Government (2013), *Annual Report 2011-12*, http://www.dsd.gov.hk/EN/Files/annual_reports/1112/en/sewage_treatment.html (accessed 26 November 2013).
304. Environment Protection Department of the HKSAR Government (2013), 'Cleaner Production Partnership Programme', http://www.cleanerproduction.hk/en_project2a.asp (accessed 20 November 2013).



© Civic Exchange, January 2014

The views expressed in this paper are those of the authors and do not necessarily represent the views of Civic Exchange and the Noble Group.