Institute of Water Policy

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Comparative Study of Urban Water and Wastewater Tariffs

Water and wastewater tariffs differ significantly across cities with difference in the local costs of water extraction, purification and distribution, the socio-economic condition of households, the revenue requirement of the water supply utility, political implications and, sometimes, the scarcity value of water. Appropriately designed tariffs can be helpful in achieving the goals of revenue sufficiency, equity and affordability, provided that other desirable aspects of water governance and resource policies are in place. Prices are also helpful in communicating resource scarcity and promoting household practices that are consistent with the goal of managing urban water resources in sustainable fashion.

Objectives

We have studied the water and wastewater tariff structures for both the domestic and non-domestic sectors in 60 developed and developing cities in 43 countries. In addition to calculating the combined water and wastewater monthly bills, we have disaggregated the water bills into the different tariff components to understand the proportions of fixed, variable and miscellaneous charges paid by consumers. Direct monetary comparison of bills is often inappropriate without analyzing the socio-economic conditions in each city. Hence, in our study, we expressed the monthly household water and sewerage bills as a proportion of the household income.

Overview of Tariffs

The water tariffs implemented in cities across the world vary not only in terms of the nominal price per unit volume but also in terms of the different components into which the tariff is categorized. There can be different levels of categorization in an urban water tariff schedule. Firstly, most cities have separate tariff schedules for metered and unmetered connections, where metered consumers pay according to the volume of water consumed and unmetered consumers pay a flat rate per billing cycle. Secondly, tariffs are usually differentiated between broad consumer groups such as domestic and non-domestic. Thirdly, domestic consumers can be again subcategorized by dwelling types and non-domestic consumers can be separated by type of activity, such as government, commercial, or industrial.

Table 1. Basic components of a water and wastewater tariff schedule for metered connections

Tariff component	Description
Basic service charge	
Fixed charge	A fixed amount paid per month or year that does not allow any minimum volume of consumption; usually depends on the meter size and accounts for the cost of infrastructure and account maintenance; basic charges for water and wastewater can be combined or separate
Minimum charge	A fixed amount paid per month that allows a minimum volume of free water
Volumetric water charge	
Increasing block tariff (IBT)	A charge per unit volume which increases step-wise according to the level of consumption
Decreasing block tariff (DBT)	A charge per unit volume which decreases step-wise according to the level of consumption
Constant unit charges (CUC)	A charge per unit volume which remains uniform for all levels of consumption
Seasonal charge	A charge per unit volume which changes with the time of the year to account for peak (summer) and off-peak (winter) demands; can be any of the three types listed above (IBT, DBT or CUC)
Wastewater or sewerage charge	
Volumetric charge	A charge per unit volume of wastewater discharged (usually assumed to be same as the volume of water consumed); can be of any of the three types listed above (IBT, CUC or DBT)
Flat	A fixed percentage (usually less that 100%) of the water bill
Additional components	
Conservation or pollution tax	A fixed percentage of the total water bill to account for the scarcity value of water or the environmental externalities caused by discharge of wastewater
Stormwater or property drainage charge	A fixed charge per month or year that depends on the land area of the property; accounts for the fact that rainwater falling on a paved property ultimately discharges into the public sewers and increases the volume of wastewater to be treated
Capital contribution	A temporary fixed charge to earn revenues for development of additional infrastructure to meet expanding demands

In our study, about half of the 60 cities have a basic service charge for water supply and one-third have a basic charge for wastewater services. In case of volumetric water tariff, about 60% of the cities implement an increasing block tariff (IBT), 35% use a constant unit charge (CUC) and only 5% has a decreasing block tariff (DBT). However, for volumetric wastewater charges, about 43% of the cities implement a CUC and 17% charge a fixed percentage of the water bill. Only 10% of the cities apply an IBT for volumetric wastewater tariff. A comparatively smaller number of cities implement a conservation or environmental tax, while stormwater drainage charges are only applied by some utilities in Europe and Australia.

Domestic water and wastewater bills

We have estimated the water and wastewater bill for a household consuming an average of 20 m^3 of water per month and expressed the bill as a proportion of the household income in each of the 60 cities (Figure 1). Table 2 shows a regional analysis of the domestic and non-domestic water and wastewater bills.

The average unit domestic water and wastewater bill in Asia and Africa is much lower than the global average of USD 2.1/m^3, whereas in Europe, North America and Australia, it is higher than USD 3.5/m^3. On average, households spend about 1.5% of their monthly incomes on water and wastewater bills. For some European, Australian and American cities, the proportions are greater than 2%. In many of the Asian cities, although the monthly bills are very low, the corresponding low levels of incomes in these cities lead to a higher proportion.

For each of the 60 cities, we have also calculated the per capita annual domestic water and wastewater bills for a consumption of 155 litres per day and compared to the gross regional product (GRP) per capita of that city, province or other sub-national region. The results indicate that there is a quite strong correlation (correlation co-efficient = 0.69) between the water and wastewater bills and the GRP per capita.

Non-domestic water and wastewater bills

We have calculated the monthly water and wastewater bill for a non-domestic facility with a monthly water consumption of 100m^3 in each of the study cities (Figure 2). The non-domestic sector comprise of a wide range of consumer types, including shops, commercial buildings, hospitals, hotels, construction sites and factories, which differ significantly in their water consumption and in the quality of wastewater discharged. Yet, only a few cities have different tariff rates for each of these sub-categories.

As shown in Table 2, the global average water and wastewater bill for the non-domestic sector is similar to that of the domestic sector. Interestingly, in the developed regions such as Europe, North America and Australia, the unit bill for the non-domestic sector is relatively lower that the domestic sector. In the developing regions of Asia, Latin America and Africa, the average unit price for non-domestic sector is higher than that of domestic, indicating a tendency of cross-subsidization.

Note: The calculated monthly bills are based on existing tariffs (as of January 2013). In cities where sub-categories of tariffs exist, rates for multi-family dwellings (in case of domestic sector) and commercial buildings (in case of non-domesitc sector) have been considered. A meter size of 20mm has been assumed for both sectors. Taxes have been excluded.

Table 2. Regional analysis of domestic and non-domestic water and wastewater tariffs

Region	No. of cities studied	Domestic water and wastewater tariff			Non-domestic water and wastewater tariff		
		Mean bill for 20m^3 per month (USD)	Median bill for 20m^3 per month (USD)	Average price (USD/m^3)	Mean bill for 100m^3 per month (USD)	Median bill for 100m^3 per month (USD)	Average price (USD/m^3)
South Asia	7	4.20	4.00	0.21	92.90	93.70	0.93
Southeast Asia	8	9.10	5.60	0.46	88.60	78.90	0.89
East Asia	5	21.60	13.30	1.08	110.10	82.90	1.10
Sub-Saharan Africa	5	13.68	10.96	0.68	163.20	189.68	1.63
MENA	5	25.97	22.50	1.30	201.64	134.10	2.02
Australia	4	89.37	92.81	4.47	416.13	414.26	4.16
Latin America	5	48.30	34.30	2.42	337.17	228.84	3.37
North America	9	71.50	58.80	3.58	282.96	286.76	2.83
Europe	12	79.41	87.53	3.97	319.34	334.30	3.19
Total	**60**	**42.38**	**31.78**	**2.12**	**224.38**	**185.45**	**2.24**

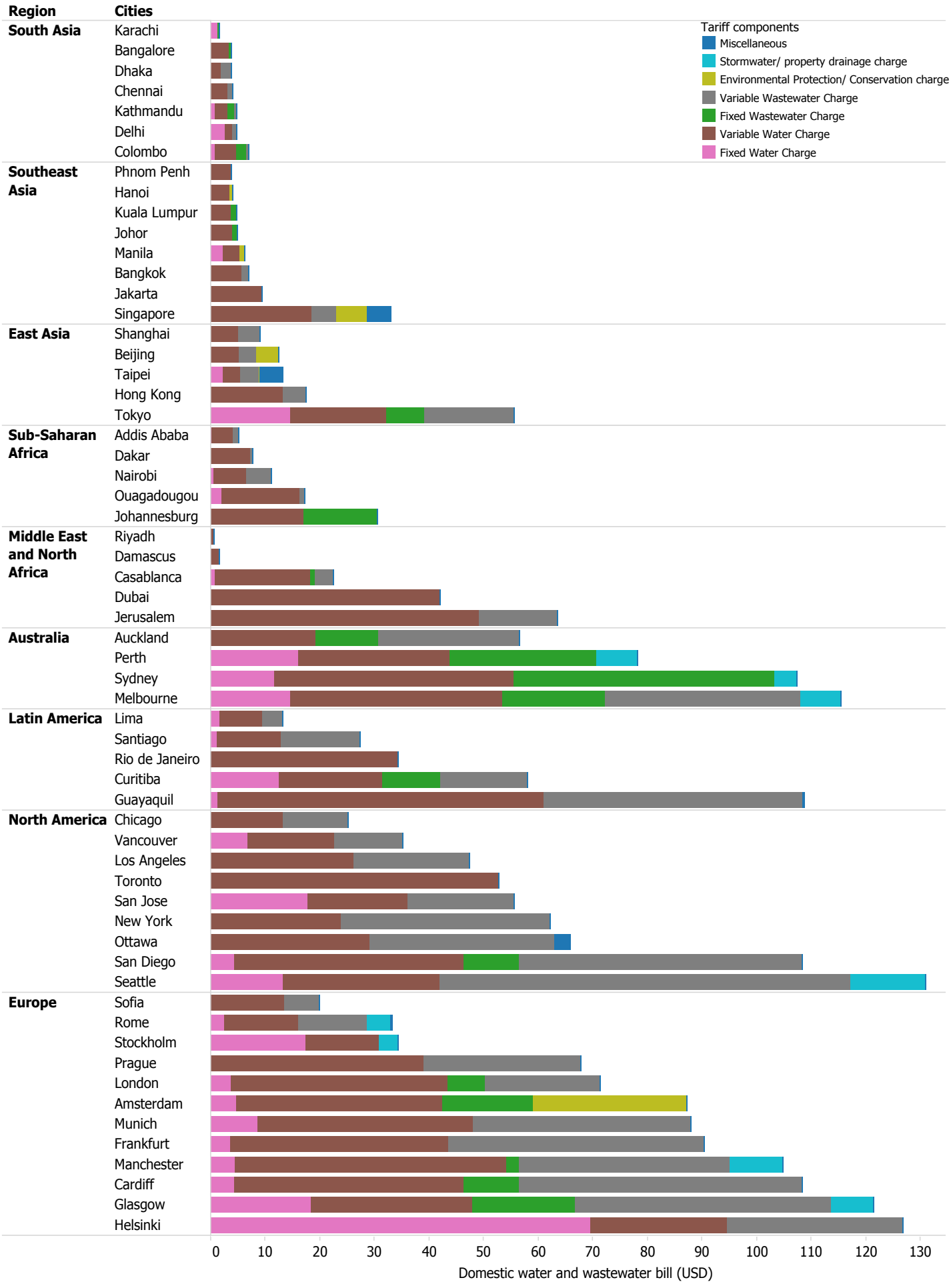

Figure 1. Domestic water and wastewater bill for a consumption of 20 m^3 per month (USD 2011 average exchange rates)

The Institute of Water Policy is a research center affiliated with the Lee Kuan Yew School of Public Policy at the National University of Singapore. Our mission is to enhance understanding of the social and economic dimensions of policies and programs implemented to improve water management.

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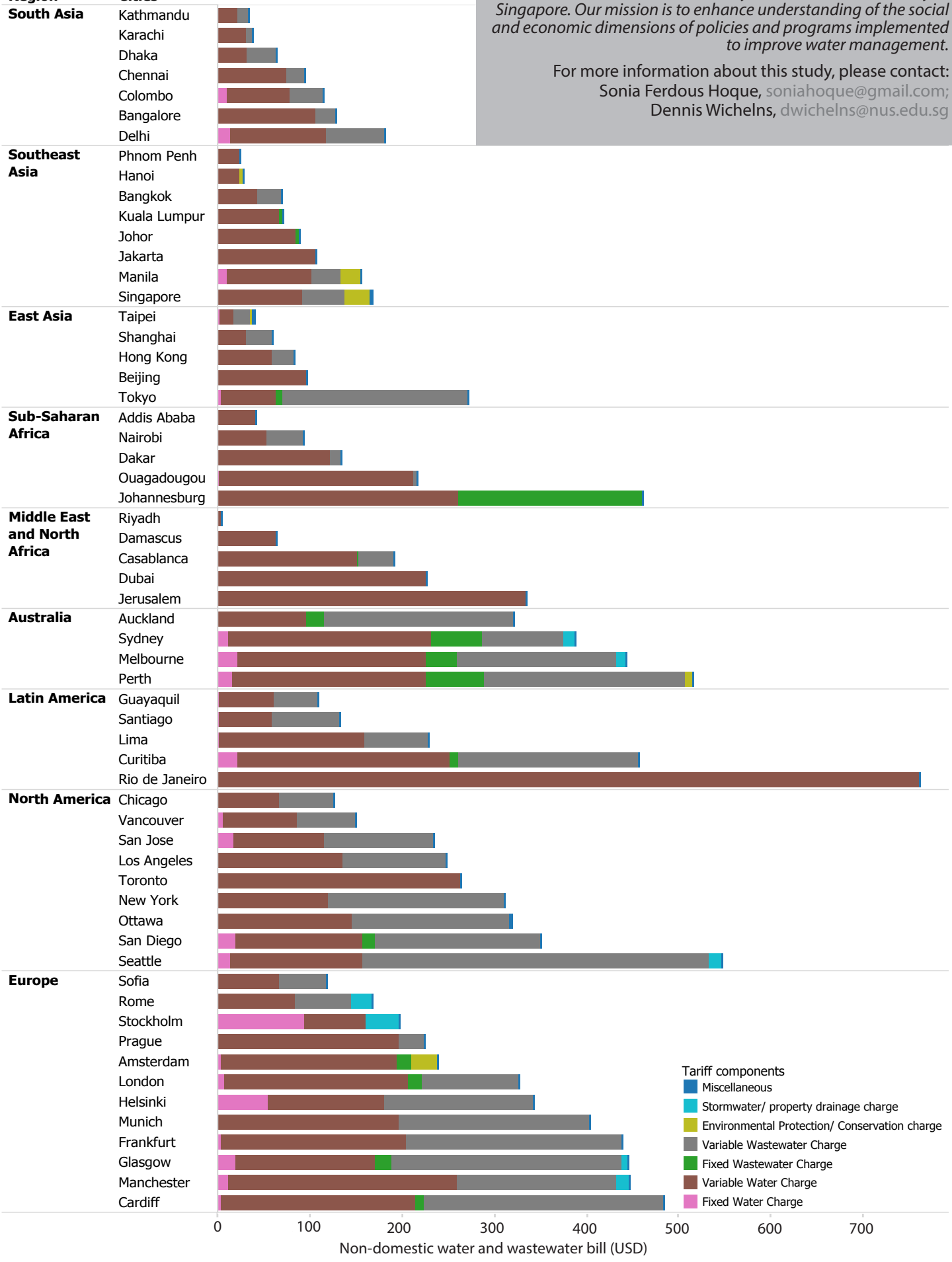

Figure 2. Non-domestic water and wastewater bill for a consumption of 100 m^3 per month (USD 2011 average exchange rates)