REGULATED INDUSTRIES COMMISSION

Review of the State of the Water and Sewerage Authority 2016-2019

June 2022

This "Review of the State of the Water and Sewerage Authority (WASA) 2016 – 2019", is being published for the information of stakeholders as part of the Price Review for WASA.

Information Document

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1. INTRODUCTION

The Regulated Industries Commission Act, No. 26 of 1998, established the Regulated Industries Commission (RIC) as the economic regulator for the water, wastewater and electricity sectors in Trinidad and Tobago. This Act mandates the RIC to carry out studies of efficiency and economy of operation and of performance of service providers, publish the results thereof and take action, where necessary, to protect the interests of customers and other stakeholders.

1.1 Purpose of the Document

This *"Review of the State of the Water and Sewerage Authority (WASA) 2016 – 2019"*, is being published for the information of stakeholders as part of several documents that accompany the Price Review exercise for WASA. The purpose of this document is to present information on various aspects of the operational and financial state of WASA over the period 2016-2019.[1] It also provides an overall assessment of WASA's annual performance, over the period under review.

1.2 Structure of the Document

The remainder of this document is arranged into five sections. Section two outlines the structure of the water and wastewater sector in Trinidad and Tobago and the major stakeholders within the sectors. Sections three and four provide assessments of WASA's operational and financial performance respectively. The existing tariff structure and rates are presented in Section five followed by a brief conclusion in Section six.

Information for this review has been sourced from WASA. The RIC has taken steps to verify all the information submitted by WASA, where possible, for use in this document. In some instances, the RIC did its own calculations and derivations using data provided by WASA. The RIC also consulted secondary sources of information including research conducted by third parties.

[1] The RIC's Review of the State of WASA for the 2010-2015 period can be accessed on the RIC's website.

1.3 Responding to this Document

This document is being released for information, however, if you require clarification or wish to comment on any aspect of this document, the RIC may be contacted at the following address:

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Copies of this document are available from RIC's Information Centre or from the RIC's website.

2. WATER AND WASTEWATER SECTOR

2.1 Sector Overview

The water and wastewater sector in Trinidad and Tobago comprises a number of key stakeholders, which are shown in figure 1 and discussed below.

The Water and Sewerage Authority (WASA) was established by an Act of Parliament in 1965 to manage the water and wastewater resources of the country.[2] It is a vertically integrated,[3] statutory authority which is wholly government-owned.[4] WASA is the major producer of water in Trinidad and Tobago, and its production is supplemented with water purchased from two (2) desalination companies, the Desalination Company of Trinidad and Tobago Ltd (Desalcott)[5] and Seven Seas Water. WASA is solely responsible for the transmission and distribution of potable water throughout the country and it is the main provider of wastewater services in Trinidad and Tobago.

The Ministry of Public Utilities (MPU) is responsible for policy-making and administrative oversight of the water and wastewater sector. It is WASA's line ministry and it establishes the strategic framework within which WASA operates. The Ministry's mandate is to provide effective and efficient leadership and governance in the delivery of public utility services.[6] Under the RIC Act, the Minister (of Public Utilities), is also responsible for granting licences for services which fall under the ambit of the RIC, which include the provision of water and wastewater services.

The Ministry of Finance has overall responsibility for all financial matters pertaining to the funding of government-owned entities and it provides significant subventions to WASA (for operating and

[2] WASA currently has responsibility for overall water resources management as the Water Resources Agency (WRA), which is currently a division within WASA, is responsible for the collection and analysis of basic hydrological and hydro-meteorological data used to determine the quality and quantity of surface and groundwater resources. The Agency's data collection system comprises a monitoring network of gauges which measures and reports on rainfall, streamflow, groundwater, evaporation and water quality parameters at strategically located sites throughout the country. The WRA is also responsible for issuing water abstraction licenses, which are legal contracts conferring the right to use the water abstracted from a surface or groundwater source.

[3] WASA controls operations and processes in the production, transmission and distribution of water.

[4] The RIC paper entitled "Improving incentives for a Public Sector Monopoly" discusses the particular issues which arise in the utility sector because of government ownership and operational control of these entities.

[5] Desalcott was originally a joint venture between Hafeez Karamath Engineering Services Limited (HKESL) and Ionics Inc. (USA). In 2012, HKESL became 100% shareholder of Desalcott.

[6] Updated Public Statements of the Ministry of Public Utilities 2019 Annual Statement on "The Freedom of Information (FOI) Act Chapter 22:02". Ministry of Public Utilities, 2019.

capital expenditure). WASA's tariff has not kept pace with the cost of providing potable water and the utility has historically been unable to finance capital projects from internally generated funds. Consequently, all large capital expenditure projects to be undertaken by WASA must be approved by the Ministry of Finance, as it either provides direct funding for some of these projects through the annual budget, or government guarantees for loans when funding is sought for capital projects from the commercial banking sector. Additionally, the Ministry of Planning and Development and WASA's line Ministry are also involved, when it is necessary to secure funding for WASA from multilateral lending agencies.

The Ministry of Health is responsible for setting, monitoring and enforcing the standards for the quality of drinking water in Trinidad and Tobago. However, no drinking water standards specific to Trinidad and Tobago have been set. World Health Organization (WHO) standards are currently utilized.

The RIC is the economic regulator for the water and wastewater sector as indicated above. Its powers and functions include, but are not limited to:

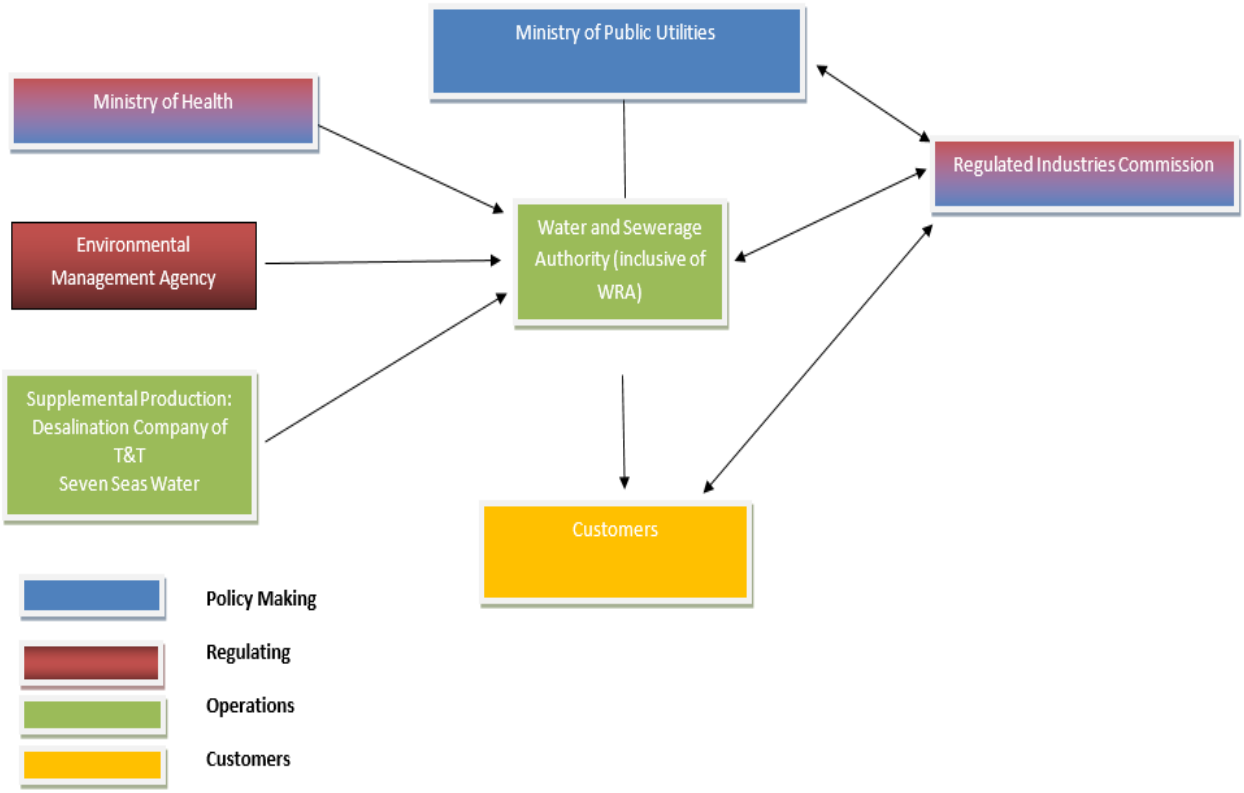
1. Advising the Minister on the operation of the Act, including the granting of licences [Section 6(1)(a)];
2. Ensuring that service providers operate under prudent management, on terms that will allow sufficient return to finance investment [Section 6(1)(c)];
3. Prescribing and publishing service standards; imposing sanctions for non-compliance to service standards [Sections 6(1)(e), (g)];
4. Establishing principles and methodologies for rate-setting [Section 6(1)(h)]; and
5. Investigating complaints by consumers of failure to obtain redress from utility service providers and facilitating redress [Section 6(1)(l)].

The Environmental Management Authority (EMA) is a statutory body (established by the EMA Act 1995) responsible for environmental protection and conservation, which includes monitoring and enforcing water pollution levels and establishing effluent quality standards that WASA is expected to meet. The EMA issues permits that control the release of effluent into the environment from certain operations including those of WASA's water treatment and wastewater treatment plants.

Water and wastewater customers are classified into two main groups, domestic and non-domestic customer classes. Domestic customers include all premises used entirely as living quarters by private households whether owner-occupied or rented (residential) and all premises used (whether solely or partly) for business, trade or manufacturing purposes which are not registered for Value Added Tax (VAT). Non-domestic customers include industrial, commercial, cottage, agricultural customers and un-serviced premises. As at December 2019, WASA's water customer base was 430,982 while its wastewater customer base was 79,946. In 2019, out of the 430,982 water customers, only 19,691 were metered.

The major stakeholders in the water and wastewater sector are depicted in figure 1 below.

Figure 1: Major Stakeholders in the Water and Wastewater Sector



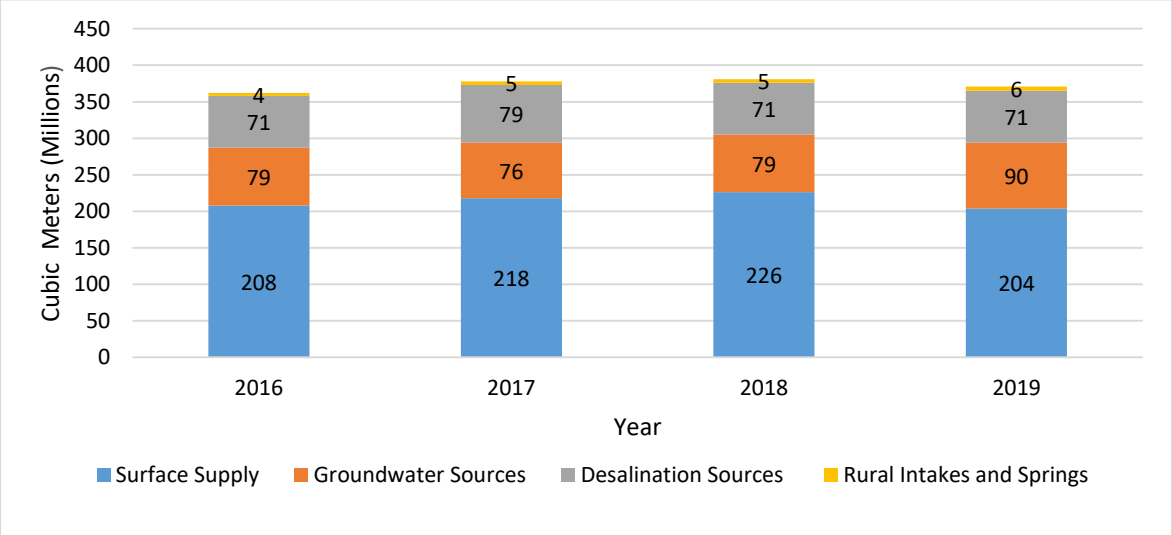
Source: RIC derivation.

2.2 Physical Profile of the Water and Wastewater Sector

WASA's mandate includes the delivery of a safe, reliable and efficient water supply, to meet the country's demand. WASA's current water production assets comprise 27 surface water treatment facilities, 35 groundwater treatment facilities, 40 rural intakes and spring sources, 229 wells, 34 service reservoirs, and 7 raw water impounding reservoirs. Its pumping and pipeline facilities comprise 95 pumping stations and approximately 7,000 kilometres of water mains (pipelines).

WASA is the main producer of water in the country, with desalinated water from contracted suppliers augmenting water production to a lesser extent. In 2019, total water production[7] was 371 million cubic meters, which was on par with the average production over the 2016-2019 period of 374 million cubic meters. Figure 2 below depicts the quantities of water produced on an annual basis for the period 2016-2019, by source.

Figure 2: Water Produced by Source



As shown in figure 2 above WASA's main water source is surface water, followed by groundwater, desalination water and rural intakes and springs. In 2019, 55% of WASA's production came from surface sources, 25% of production came from groundwater sources, 19% of production came from desalination and the remaining 1% was produced from rural intakes. WASA supplements its

[7] Total water production includes the volume of WASA's total water production from various sources in addition to the volume of water purchased from desalination companies.

own production, as indicated above, with water purchased from two (2) desalination companies, the Desalination Company of Trinidad and Tobago Ltd., (Desalcott) and Seven Seas Water.

Desalcott was established in 1999 to produce and sell desalinated water to WASA on a build-own-operate (BOO) basis for use at the Point Lisas Industrial Estate, where it is located. Desalcott was originally contracted to produce 24 million imperial gallons per day (MIGD) or approximately 109,000 cubic meters of water per day. However, in November 2012, Desalcott was contracted by WASA to increase its production to 40 MIGD or approximately 182,000 cubic meters per day, for distribution to Central and Southern Trinidad. Seven Seas Water is a U.S. based company operating in Point Fortin, Trinidad. Its plant was commissioned in September 2013 and was constructed under a build-own-operate (BOO) arrangement to deliver daily 5.5 MIGD or 25,000 cubic meters a day to WASA's transmission system. In 2015, Seven Seas was contracted to increase its production and is now delivering 6.7 MIGD or approximately 30,000 cubic meters daily to WASA for distribution primarily in the South Western Peninsula of Trinidad.[8]

WASA is also responsible for the collection, transmission, treatment and disposal of wastewater in Trinidad & Tobago and achieves this mainly through its public sewerage systems which account for approximately 35% coverage of wastewater needs of the country. In 2019, WASA treated 144 million cubic meters of wastewater. Its wastewater facilities include 45 centralized sewage treatment plants, 24 other WASA-operated plants and approximately 700kms of sewer mains. The main centralized WASA Wastewater Treatment Plants (WWTP) in Trinidad are located in Beetham, Malabar[9] and San Fernando. These main treatment plants have a larger geographical coverage and size of operations than other smaller centralized WWTPs. In accordance with a Government mandate issued in the late 1990s, WASA continues to adopt and refurbish other wastewater facilities from private developers and various government authorities, which include the former National Housing Authority (now the Housing Development Corporation (HDC)) and the Urban Development Corporation of Trinidad and Tobago (UDECOTT). In November and December 2018, WASA adopted three (3) additional wastewater facilities previously operated by HDC. WASA indicated that there are plans to adopt more plants as condition assessments and the overall adoption process remains ongoing.

[8] Source: Seven Seas Water, https://sevenseaswater.com/projects/bringing-water-to-the-people-in-trinidad/
[9] Phase 1 of the newly constructed Malabar WWTP was completed in 2019. This plant is processing all the wastewater that previously went to the Arima, Malabar (old), Greenvale and La Horquetta WWTPs.

3. THE OPERATIONAL PERFORMANCE OF WASA 2016-2019

In this section an analysis of WASA's operational performance over the period 2016-2019 is presented. WASA's operational efficiency is assessed in terms of service delivery capability, quality of service to its customers and efficiency in the use of resources to achieve organizational objectives. The service delivery capability assessment evaluates WASA's ability to serve the country's population as the monopoly supplier of water and the major supplier of centralized wastewater services in the country. The quality of WASA's service to the customers is assessed in terms of the consistency of its supply to customers and also by the number of customer complaints over the 2016-2019 period. The efficiency assessment measures WASA's ability to reduce operational and maintenance inefficiencies.

3.1 Service Delivery Capability

3.1.1 Water Coverage

The water coverage of a country is defined as that percentage of the population with direct access to potable water services either through a direct service connection or residing within 200m of a standpipe[10]. In Trinidad and Tobago, water coverage is an indicator of WASA's ability to provide access to piped water services to the population and to new developments. A 2018 study conducted on behalf of WASA[11] assessed water coverage to be 94% indicating that 6% of the population is without reasonable access to potable water.

Over the 2016-2019 period, with the exception of standpipe customers, there was an annual increase in all other sub-classes of domestic customers.[12] This indicates an increase in water coverage over time, since a greater number of new customers gained direct access to pipe - borne water during the period.[13]

[10] Source: International Benchmarking Network (IBNET), https://www.ib-net.org/toolkit/ibnet-indicators
[11] Development of an Appropriate Rate Structure: Benchmarking Report, Castalia Limited, 2018.
[12] Domestic customers can be further categorized into: standpipe, externally serviced, internally serviced unmetered, internally serviced metered, charitable institutions unmetered and charitable institutions metered customers.
[13] There was a reduction in the percentage of standpipe customers over 2016-2019 to 10% of the total number of customers, down from 11% during 2010-2015.

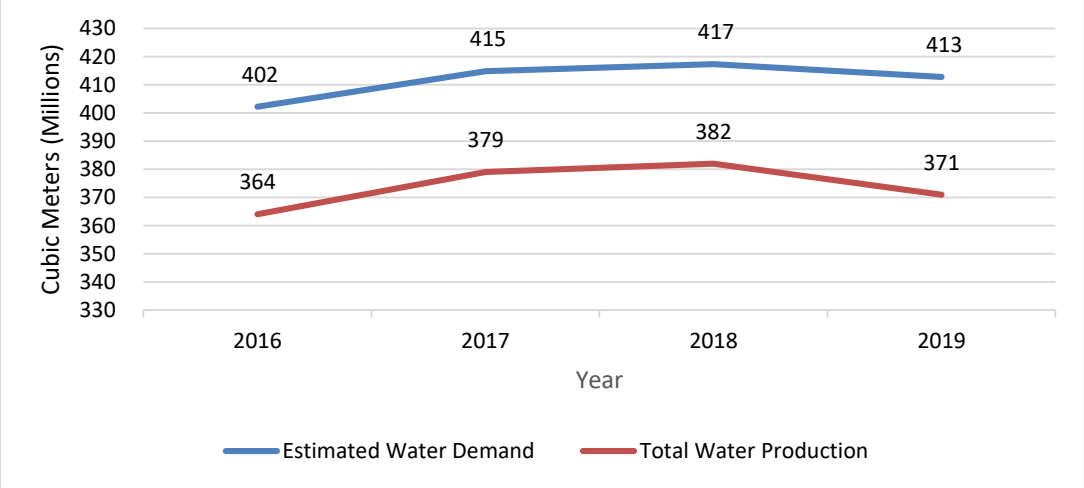
3.1.2 Wastewater Coverage

Wastewater coverage is defined as that percentage of the population with a direct connection to sewerage services. This statistic is computed by dividing the population with sewerage services (direct service connection) by the total population, and is expressed as a percentage. In 2019, WASA estimated that approximately 35% of the population is served by its facilities. The majority of wastewater treatment for the remaining 65% of the population occurs via the use of septic tanks, with a small percentage of households (7%)[14] still utilizing pit latrines.

3.1.3 Water Demand-Supply Balance

A key aspect of WASA's service obligation is delivery of potable water services to its customers, thus, the demand-supply balance is an indicator of whether there is sufficient water supply to satisfy demand. When production is less than demand, customers will receive an intermittent water supply. The estimated water demand and total water production over the period 2016-2019 are illustrated in figure 3 below.

Figure 3:Water Demand/Production Balance[15]



On average, demand exceeded production by 38 million cubic metres per annum over the period 2016-2019, with the largest difference of 42 million cubic metres occurring in 2019. WASA has

[14] There are varying estimates of the percentage of population utilizing pit latrines, depending on the source. The estimate from the United Nations Development Programme (2018) Report on Multidimensional Poverty in Trinidad is 7%. The 2011 Population Census conducted by the Central Statistical Office of Trinidad and Tobago showed 11% of households still utilized pit latrines. The RIC decided to use the more recent statistic in this report.
[15] Source: RIC derived based on data provided by WASA.

estimated per capita demand to be 440 litres per person per day or 96 imperial gallons per person per day[16]. Per capita demand in Trinidad and Tobago is high when compared with most other countries in the region[17]. For instance, per capita demand was estimated to be 273 litres per person per day in Barbados, 162 litres in Jamaica, 130 litres in Suriname, 101 litres in The Bahamas and 90 litres in Antigua. The combination of low metering (3% of domestic customers) and historically low tariffs contributes to consumers having little or no incentive to limit their demand for water.

3.2 Quality of Service

3.2.1 Service Continuity

An important quality of service indicator of WASA's performance is the continuity of water supply, which measures the average number of hours of service (water supply) per day. Data supplied by WASA revealed a noted decline in this indicator over the period 2016-2019. According to WASA, the percentage of the population served with a 24-hour supply decreased from 52% in 2016 to 41% in 2019. Therefore, in 2019, 59% of the population received a scheduled supply compared to the 48% that was receiving a scheduled supply in 2016[18].

Table 1 below depicts a break-down of the hours of service per week and corresponding percentage of the population in receipt of supply, as at December 2016 and December 2019.

Table 1: Water Service Continuity - 2016 and 2019

Class of Supply	Number of Hours per week	2016 Percentage in receipt of supply	2016 Estimate of population	2019 Percentage in receipt of supply	2019 Estimate of population
Class I	168	52%	719,111	41%	560,492
Class II	120 to 168	19%	259,314	14%	192,355
Class III	84 to 120	10%	143,022	12%	161,012
Class IV	48 to 84	17%	230,350	25%	347,937
Class V	0 to 48	2%	24,707	8%	114,707

Source: WASA (estimate of population) and RIC derived (percentage in receipt of supply).

[16] Castalia Benchmarking Report to WASA (October 2018).
[17] Ibid.
[18] Over the period 2016 to 2019, the decline in 24/7 service may be attributable to harsher dry seasons, breakdowns in plant/equipment and major leaks occurring on the transmission and distribution network.

3.2.2 Customer Complaints

Customer complaints are indicative of consumers' dissatisfaction with the quality of a product or service. Data related to WASA's billing complaints, water service complaints and wastewater service complaints are presented in table 2 below.

Table 2: Customer Complaints 2016-2019

Customer Complaints	2016	2017	2018	2019
Billing Complaints brought forward	5,538[19]	1,745	1,613	1,580
New Billing Complaints	6,011	4,111	2,942	2,734
Billing Queries Resolved	9,787	3,857	2,846	2,136
Billing Queries Cancelled	0	33	129	112
Billing Queries Re-classified	17	0	0	4
Data clean-up Migration to New Billing System	0	353	0	0
Billing Queries Outstanding	1,745	1,613	1,580	2,062
Number of Water Service Complaints[20] brought forward	0[21]	1,337	811	3,503
New Water Service Complaints	6,870	7,560	8,137	8,055
Water Service Complaints Resolved	5,533	8,086	5,445	7,932
Water Service Complaints Outstanding	1,337	811	3,503	3,626
New Wastewater Service Complaints	588	451	358	463
Wastewater Service Complaints Resolved	550	287	221	270
Wastewater Service Complaints Outstanding	38	164	137	193

Source: WASA

According to the data supplied by WASA in table 2, the number of complaints made over the period 2016-2019 reduced by 55% and 21% for new billing complaints and new wastewater services complaints respectively. Conversely, there was a 17% increase in new water service complaints over the period. WASA has not been consistent in resolving billing complaints, water service complaints and wastewater service complaints over the period. At the end of 2019, forty-eight percent (48%) of billing complaints, thirty-one percent (31%) of water service complaints and forty-two percent (42%) of wastewater service complaints were not addressed or remain unresolved[22].

[19] In 2015, WASA's customer complaints services migrated to a new reporting system which created a backlog of unresolved complaints. These unresolved complaints were brought forward to 2016.

[20] Water Service complaints relate to conditions regarding the following: low water pressure, interruption in pipe borne supply, requests for truck borne supply, leaks and reconnection/disconnection requests.

[21] WASA maintains that zero complaints were brought forward, however, the RIC remains unconvinced by this and notes that complaints in this area which were outstanding from the previous year, were brought to the RIC.

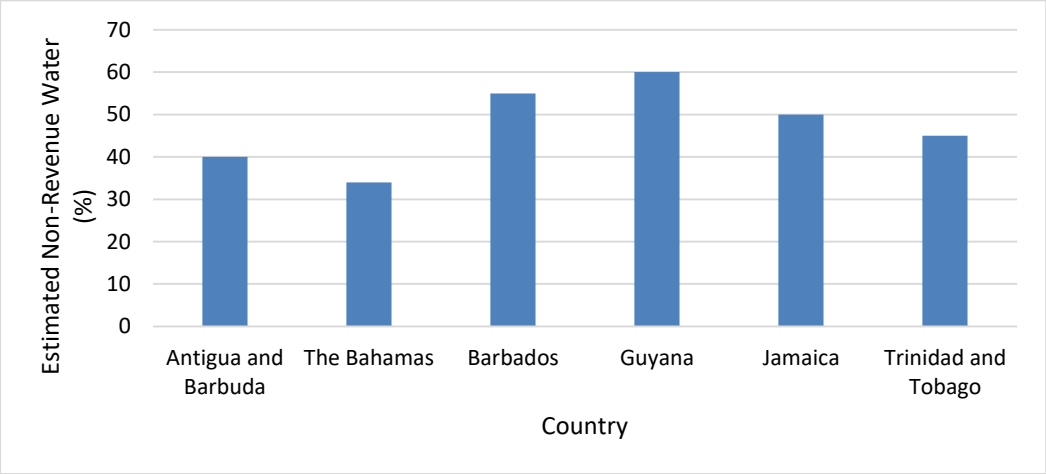
[22] The RIC queried the reasons for these unresolved complaints. With respect to billing complaints, WASA changed out its billing software in 2019, which resulted in additional billing complaints. According to WASA, the primary reason for unresolved water and wastewater service complaints is lack of financial resources.

3.3 Efficiency Measures

3.3.1 Non-Revenue Water

The level of Non-Revenue Water (NRW) is a well-established indicator that is used when assessing the efficiency of a water utility. NRW represents the difference between production (the volume of water delivered into the network) and consumption (the volume of water that can be accounted for by legitimate consumption, whether metered or not). There are three main components of NRW: unbilled authorized consumption[23], technical losses[24] and commercial losses.[25] Higher NRW reflects greater inefficiency because costs are incurred to collect, treat and distribute water, and a significant portion of this treated water is lost, without the possibility of earning revenue to cover the cost of production. Further, substantial capital expenditure programmes are often implemented to meet increasing demand. NRW is typically measured as the volume of water "lost" as a share of net water produced. High levels of NRW are detrimental to the financial viability of water utilities and also to water quality, as leaking pipelines can allow potentially harmful contaminants into the water supply. Figure 4 illustrates the estimated levels of NRW among some countries in the region.

Figure 4: Estimated Non-Revenue Water (by Country)[26]



[23] Unbilled authorized consumption includes water used by the utility for operational purposes, water used for firefighting and water provided at no charge to certain consumer groups.
[24] Technical losses are also referred to as physical losses and entails all water losses from leakage on transmission and distribution mains, leakages and overflows at the utility's storage tanks and leakage ion service connections up to point of the customer.
[25] Commercial losses entail all unauthorized consumption and metering inaccuracies and data handling errors.
[26] Figure derived by RIC using data from WASA and information from Liemberger R., Wyatt A. (2018) *Quantifying the global non-revenue water problem*, Water Science and Technology.

From the countries depicted in figure 4, Barbados and Guyana have the highest levels of NRW, while The Bahamas and Antigua and Barbuda have the lowest levels. WASA estimated its NRW to be 53% in 2019. A substantial amount of water is lost, due to technical losses, mainly as a result of the high number of pipe breaks within the distribution network. Also, the level of NRW is amplified due to commercial losses which comprise unbilled authorized consumption and unauthorized consumption through illegal usage. While it is ideal for NRW to be as low as possible[27], according to the World Bank, reducing NRW to 20-25% is a reasonable objective.[28] It is important to note however, that there are fewer financial incentives for a utility to reduce NRW if there is low deployment of metering (revenues are independent of actual consumption), or if volumetric tariffs are low.

3.3.2 Pipe Network Performance

Pipe network performance is an efficiency and reliability metric that is directly related to the level of NRW. Measuring pipe network performance can assist in evaluating the utility's achievement in maintaining and retrofitting ageing infrastructure to minimize leaks and pipe breaks. Pipe network performance can be assessed in terms of the number of pipe breaks relative to the scale of the system (for instance, on a 'per kilometre of pipeline' basis), or the total number of pipe breaks per year expressed per number of water connections.

WASA reported in 2019, that 53% of its pipelines comprising PVC, ductile iron and high-density polyethylene, were in good condition, while the remaining 47%, comprising cast iron, galvanized wrought iron, asbestos cement and grey PVC were in need of upgrading or replacement. The level of encrustation found in older pipes as a result of corrosion, combined with pipes that are now undersized to meet current demand, limits the water flow available to customers and therefore, affects the quality of service. The frequency of pipe breaks is exacerbated as a result of encrustation since WASA has to increase the water pressure to compensate for the restriction in diameter, which in turn causes breakage. Consequently, in 2019, WASA experienced approximately 4.3 breaks per

[27] From an economic point of view, it may not be prudent to reduce NRW to the lowest possible level, as this can be extremely costly. Instead, it is advisable that the water utility estimate the economic level of leakage, which is the optimum leakage level below which the costs of reducing leakage further exceed the costs of producing water from another source.

[28] Tyman, Nicola; Kingdom, Bill, 2002. A Water Scorecard: Setting Performance Targets for Water Utilities. Viewpoint. World Bank.

km of water distribution network per year compared to a well-maintained utility which has less than one pipe break per km of distribution pipeline per year.[29] Despite efforts to either replace portions of and/or expand the network, pipe network performance remains well below international best practices. Table 3 illustrates pipe breaks by region for the period 2016-2019.

Table 3: Number of Pipe Breaks 2016-2019

	2016	2017	2018	2019
North:	11,454	9,560	8,814	11,363
South:	12,095	8,729	8,704	10,137
Central:	5,507	3,608	3,329	3,778
Tobago:	4,412	3,935	4,236	4,560
Total	**33,468**	**25,832**	**25,083**	**29,838**

Source: WASA

The high incidence of pipe breaks is indicative of WASA's inability to maintain and replace aged infrastructure. An intermittent water supply causes additional stress on distribution pipes and adds to the level of leakage and pipe breaks.[30] It is also an indication of poor service delivery and network efficiency as the pipe breaks are likely to cause interruptions in service to customers.

3.3.3 Metering Level

Metering is an essential tool (coupled with an appropriate pricing regime) for promoting water use efficiency (demand side management). In the absence of meters, customers are billed at a flat rate, that is, that they pay the same amount regardless of how much water they use. Metering allows customers to monitor their usage, and when combined with an appropriate pricing structure, encourages water conservation. Additionally, an analysis of metered end-use water consumption against bulk metered data, can assist with the identification and repair of leaks, which will reduce NRW. Also, charging customers by volume consumed sends a price signal to customers to use the

[29] The RIC did its own research (as early as 2005) using various secondary data sources to derive an appropriate benchmark. As recently as 2021, the metric was interrogated and remains fit for purpose. See Toronto Water Services 2016 Performance Measurement & Benchmarking Report which provided the annual number of pipe breaks per 100km of pipe from 2007-2016, for that jurisdiction.

[30] Inter-American Development Bank, (2017). "Intermittent Supply in The Context of Efforts to Improve Piped Drinking Water Supply in Latin America and The Caribbean".

resource more efficiently. Metering, therefore, allows for greater control of service quality monitoring and regulation of these services.

In 2019, only 3% or 12,533 of WASA's domestic customer base of 416,889 was metered[31], as shown in table 4. In 2019, WASA's metering levels for industrial, commercial, cottage and agricultural customers were comparatively better at 82%, 60%, 25% and 40% respectively, with significant room for improvement to attain best practice metering levels of 100%.

Table 4: Metered Customers 2016 – 2019

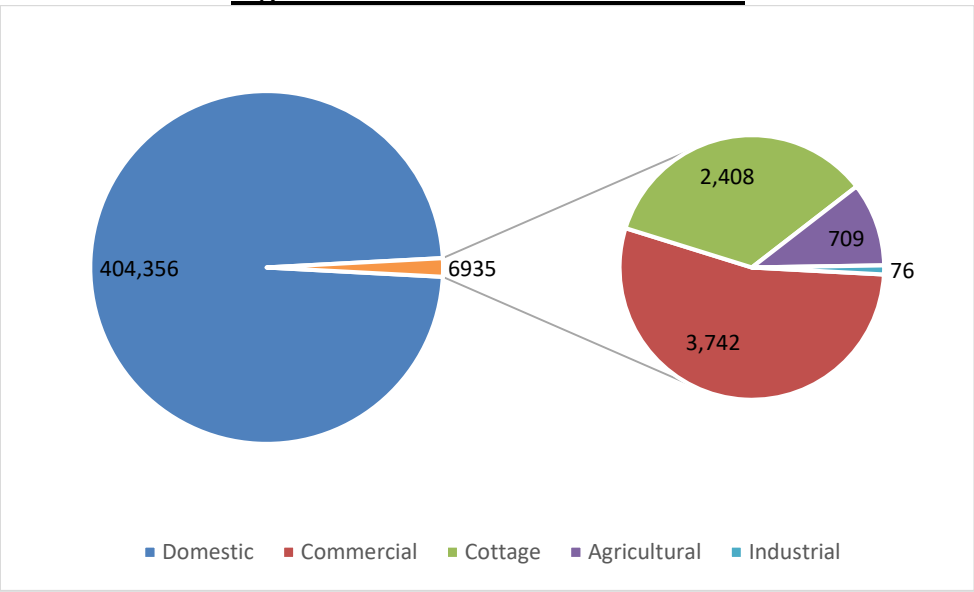
	2016	**2017**	**2018**	**2019**
Metered Domestic Customers	10,515	11,122	11,970	12,533
Total No. of Domestic Customers	**405,434**	**408,943**	**413,686**	**416,889**
% Metered	3%	3%	3%	3%
Metered Industrial Customers	344	340	345	348
Total No. Industrial Customers	**423**	**417**	**422**	**424**
% Metered	81%	82%	82%	82%
Metered Commercial Customers	5,414	5,473	5,508	5,550
Total No. Commercial Customers	**8,928**	**9,046**	**9,141**	**9,292**
% Metered	61%	61%	60%	60%
Metered Cottage Customers	752	773	783	793
Total No. Cottage Customers	**3,202**	**3,175**	**3175**	**3,201**
% Metered	23%	24%	25%	25%
Metered Agricultural Customers	467	471	469	467
Total No. Agricultural Customers	**1,165**	**1,169**	**1,172**	**1,176**
% Metered	40%	40%	40%	40%
Total Metered	17,492	18,179	19,075	19,691
Total Customer Base	**419,152**	**422,750**	**427,596**	**430,982**
% of Customer Base Metered	4%	4%	4%	5%

Source: RIC derived percentages using data supplied by WASA.

[31] "Universal Water Metering in Trinidad and Tobago – A Concept Outline" can be accessed on the RIC's website.

The composition of unmetered customers by customer class for the year 2019 can be seen in figure 5 below.

Figure 5: Unmetered Customers 2019



Source: RIC derived using data supplied by WASA

Given WASA's high levels of NRW (53%) a key element to managing commercial losses is the implementation of a valid and reliable metering system.

3.3.4 Staffing Levels

The planning and analysis of the staffing structure of any organization are necessary to ensure functional areas are adequately and efficiently staffed. Decisions regarding staffing of utilities may be impacted by numerous factors including the size of the utility supply area[32], the level of service provided to the consumer, salaries, work culture, organizational structure and ownership of the utility.

WASA's staffing levels are presented in table 5 below. In WASA's water operations, staff numbers decreased over the period by 3% from 4,716 in 2016 to 4,568 in 2019. Conversely, staff in WASA's wastewater operations increased by 14% from 317 in 2016 to 361 in 2019.

[32] A larger supply area may require a larger number of utility staff to ensure a particular standard of service within the service area.

Table 5: Staffing Levels: Water and Wastewater 2016-2019

	2016	2017	2018	2019
Water				
Monthly Paid Administrative	1,688	1,657	1,637	1,590
Monthly Paid Technical	1,143	1,254	1,271	1,230
Daily Paid	1,885	1,817	1,769	1,748
Total Water	**4,716**	**4,728**	**4,677**	**4,568**
Wastewater				
Monthly Paid Administrative	55	59	39	49
Monthly Paid Technical	135	137	136	147
Daily Paid	127	149	162	165
Total Wastewater	**317**	**345**	**337**	**361**
Total Staff Numbers	**5,033**	**5,073**	**5,014**	**4,929**

Source: WASA

Staff per connection is a measure of labour productivity, as more efficient use of human resources in a utility is manifested in a lower ratio of staff per 1,000 connections. As seen in table 6 below, the total number of employees decreased by 104 from 5,033 to 4,929 over the period 2016-2019, while the increase in the number of connections[33] was 13,000 over the same period. Notwithstanding, WASA's staff per 1000 connections remained constant at 13 throughout the four-year period. Despite efforts to further reduce staff levels, WASA has been unable to attain best practice[34] in this area, which is a range of 4-6 staff per 1000 connections for well-managed water utilities in developing countries.

Table 6: Staff per Connection 2016 - 2019

	2016	2017	2018	2019
Number of employees	5,033	5,073	5,014	4,929
Number of water connections (000's)	373	377	382	386
Staff per 1000 water connections	13	13	13	13

Source: WASA

[33]WASA indicated that the variance between the number of connections and number of customers (more customers than connections) is due to the A1 – Standpipe and C1- Un-serviced commercial classes. Both these classifications refer to customers without a water service connection to their premises.

[34] Ashraf Abdel-Hamid Mohamed Khedr. (2000), "Socio-Economic Assessment of Water Supply in Rural Egypt", World Bank.

4. THE FINANCIAL PERFORMANCE OF WASA 2016-2019

4.1 Overview

This section presents an analysis of WASA's financial position and its financial performance over the years 2016 to 2019. It is intended to assess WASA's ability to control its costs and earn sufficient revenue, as well as to measure key areas of the utility's commercial practices over the period. Financial ratios highlight trends and are also useful for examining WASA's financial health over the outlined period. Overall, WASA experienced financial deficits throughout the period and therefore, was unable to fully meet its financial obligations in any of the years under review. The following subsections present a more detailed analysis of WASA's financial statements with a focus on its revenue, expenditure, assets and liabilities.

4.2 Expenditure Analysis

WASA's total expenditure comprises operating and non-operating expenses. Operating expenditure comprises all the expenses incurred from the production and supply of water and wastewater services and accounted for 84% of total expenditure in 2019. Non-operating expenses include items such as depreciation and financing.

4.2.1 Operating Expenditure

WASA's operating expenditure can be categorized into controllable and uncontrollable costs, depending on the degree to which the utility's actions can influence actual expenditure.

Table 7: WASA's Operating Expenditure 2016-2019

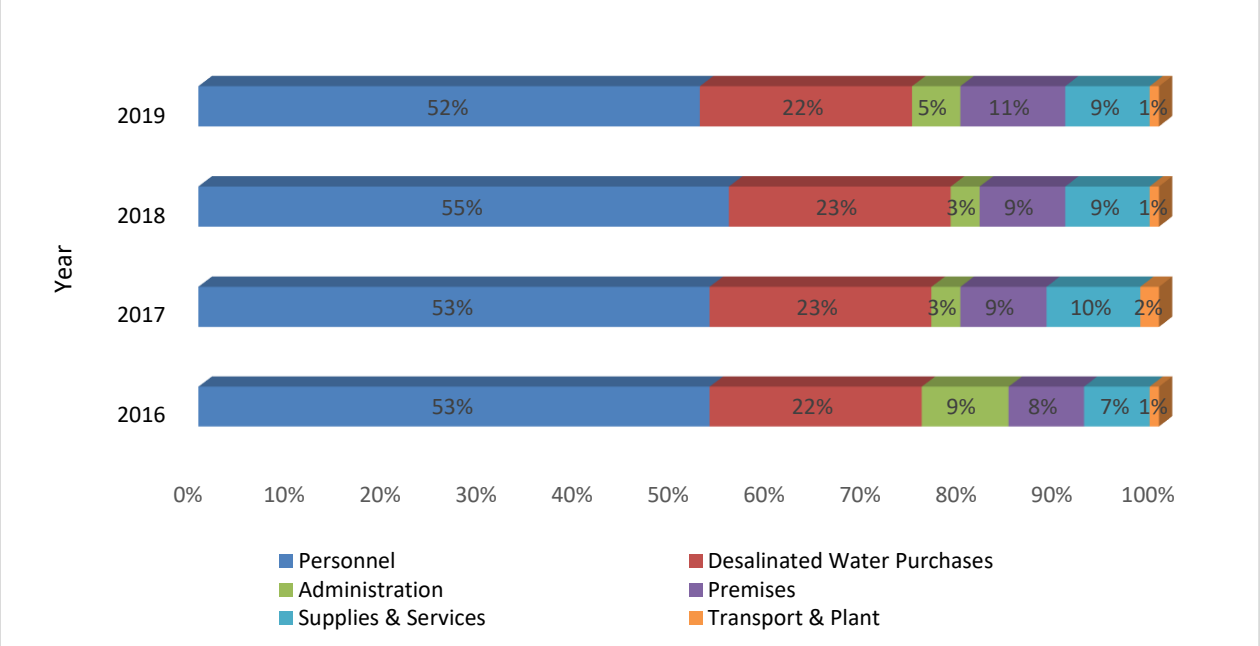
	2016	**2017**	**2018**	**2019**	**2016 to 2019**	
Operating Expense	$Mn	$Mn	$Mn	$Mn	$Mn Change	% Change
Personnel	1,218	1,242	1,256	1,247	29	2%
Supplies & Services	150.48	242.92	216.15	217.59	67	45%
Desalinated Water Purchases	505.60	530.30	523.35	527.74	22	4%
Administration	226.05	74.05	80.18	106.42	(120)	-53%
Premises	178.04	200.00	195.51	250.14	72	40%
Transport & Plant	27.65	37.94	29.54	31.77	4	15%
Total	**2,306**	**2,326**	**2,300**	**2,380**	**74**	**3.2%**

Source: WASA

As can be seen in table 7 above, WASA's operating expenditure increased by 3.2% from $2.3 billion in 2016 to $2.38 billion in 2019. Notably, Supplies and Services increased by 45% from $150 million in 2016 to $217 million in 2019[35]. Premises costs increased by 40% and peaked at $250 million in 2019, while personnel expense[36] had a slight increase of 2% over the same time period. Administration expense is the only component of operational expenditure that did not increase over the period, but decreased significantly by 53% from $226 million in 2016 to $106 million in 2019[37] which was mainly attributable to a large pay-out for the settlement of claims in 2016.

Apart from observing changes in expenditure year on year, another useful way of assessing the expenses of a utility is an examination of its relative cost structure, that is, the proportion of costs in relation to one another over the period. The operating expenditure cost allocations by year, over the period 2016-2019 can be seen in figure 6 below.

Figure 6: Operating Expenditure – Allocations 2016-2019



Source: RIC derived percentages using data supplied by WASA.

[35] Supplies and Services include materials and inventory purchases, water trucking and security costs. WASA indicated that the 2016 value was anomalously low, as there was difficulty obtaining approvals for certain projects during 2016.
[36] Personnel expenses comprise Salaries and Wages, each of which are further broken down into components including Basic Pay, Overtime, National Insurance, Cost of Living Allowance, Gratuity and Backpay.
[37] Administrative expenses are made up of communications and general expenses, both of which decreased over the 2016-2019 period.

4.2.1.1 Controllable Costs

The majority of WASA's operating expenses are controllable. These expenses comprise personnel, supplies & services, administration, premises and transport & plant.

Personnel expenditure dominated the cost structure of WASA's operating expenses as seen in figure 6. Notwithstanding the general increase in totals per category of expense over the period 2016 to 2019 (as shown in table 7), there was general consistency in the contribution of each category to total operating expenses over the period (figure 6). The two categories of transport & plant cost and administration costs accounted for the smallest portion of total operating expenses from 2017-2019.

4.2.1.2 Uncontrollable Cost

One of the major components of expenditure is desalinated water purchased from two companies, Desalcott & Seven Seas. Desalinated water costs are considered uncontrollable because they are included in water purchase agreements (WPAs) and are subject to long-term contractual arrangements. WASA, therefore, has very little or no control over these costs. The cost of purchasing desalinated water increased by 4.8% from 2016 to 2017 and thereafter decreased by 0.5% over the remainder of the period (see table 7).

4.2.2 Total Expenditure

WASA's total expenditure includes operating expenses and non-operating expenses, such as depreciation and financing. As seen in table 8, WASA's non-operating expenses accounted for $438.82 million or 15.6% of total expenditure in 2019.

Table 8: Total Expenditure

	2016	2017	2018	2019
	$Mn	$Mn	$Mn	$Mn
Total Operating Expenses	2,306	2,326	2,300	2,380
Non-Operating Expenses				
Depreciation	391.35	249.89	250.76	269.54
Financing	900.73	242.88	227.29	169.28
Total Non-Operating Expenses	1,292.08	492.77	478.05	438.82
Total Expenditure	**3,598.08**	**2,818.77**	**2,778.05**	**2,818.82**

Source: WASA

4.2.3 Capital Expenditure

Capital expenditure is the amount spent to acquire or upgrade productive assets (such as buildings, machinery, equipment and vehicles) in order to increase the capacity or efficiency of the utility for more than one accounting period. WASA's capital expenditure over the period 2016-2019 is illustrated in table 9 below. The data shows that in all years during the period, the majority of WASA's capital expenditure was in wastewater. The percentage of capital expenditure on wastewater was at a maximum of 98% in 2016 and a minimum of 72% in 2017. The total capital expenditure was approximately $1.5 billion over the period, with 80% spent on wastewater and 20% on water, as can be seen in table 9 below. The main source of funding for WASA's wastewater capital programme was via a loan programme through the Inter-American Development Bank (IADB) to reduce the discharge of untreated water in Trinidad and Tobago.[38]

Table 9: WASA's Capital Expenditure 2016-2019

	2016	2017	2018	2019	2016-2019
Category	**$ Mn**	**$ Mn**	**$ Mn**	**$ Mn**	**$ Mn**
Water	3.60	169	59.60	59.0	291.20
Wastewater	160.60	425	315	301	1,201
Total	**164.20**	**594.00**	**374.60**	**360.0**	**1,492.20**

Source: WASA

4.3 Revenue Analysis

WASA's total revenue comprises operating and non-operating revenue. Operating revenue is the income received from the sale of water and wastewater treatment which averaged 27% over the four-year period. In 2019, the major sources of WASA's non-operating revenue (by percentage of total revenue) were government subventions (69%), interest income (.02%) and sundry payments (1.4%) respectively (see table 11 below for actual values). Over the 2016-2019 period, non-operating revenue averaged 73% of WASA's total revenue.

[38] In 2012, the IADB approved a 25-year term loan of US$246.5 million as the first of a three-phased, US$546.5 million programme for wastewater infrastructure improvement in Trinidad and Tobago.

4.3.1 Operating Revenue

Operating revenue is derived from income for services provided by WASA, which includes the supply of water, wastewater treatment, connection fees and penalties. WASA's main source of operating revenue is its water (potable and abstraction) and wastewater operations.

WASA's operating revenue disaggregated by water and wastewater is seen in table 10. Over the period 2016 to 2019, WASA's operating revenue for water fluctuated, starting with a high in 2016 of $715.46 million, decreasing by 8% to $659.01 million in 2017 and decreasing further by 0.4% in 2018 to $656.62 million. In 2019, however, operating revenue increased by 7% to $701.15 million. Revenue from abstraction, though small in nominal value, declined by 45% over the period.

Table 10: Operating Revenue 2016-2019

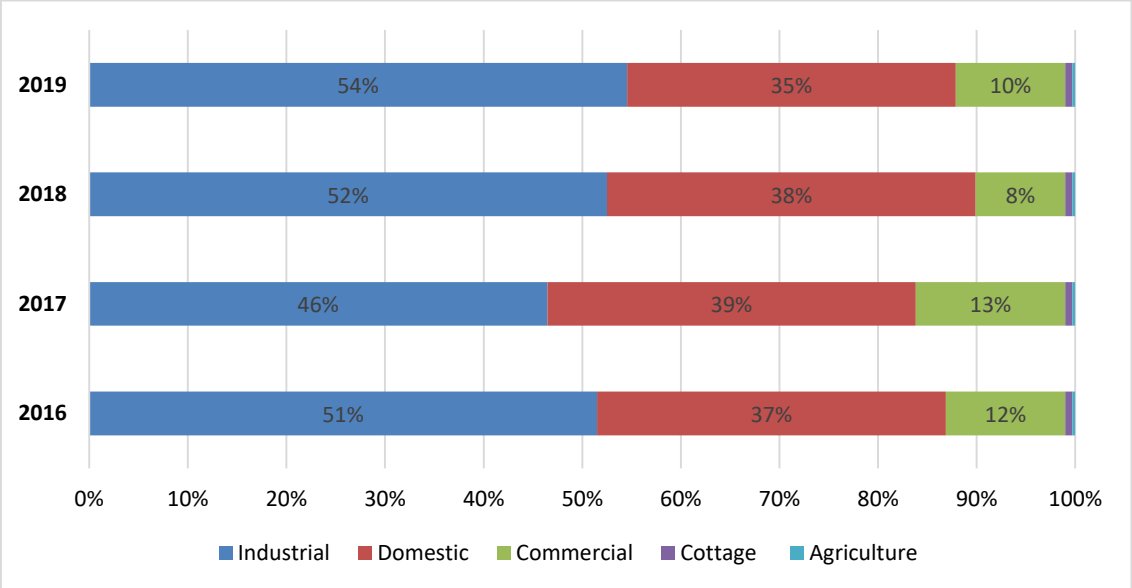
	2016	2017	2018	2019	**2016-2019**	
	$ Mn	$ Mn	$ Mn	$ Mn	$ Mn change	% change
Water Revenue						
Domestic	263.93	259.02	250.68	245.50	-18.43	-7%
Commercial	77.90	87.70	51.52	67.48	-10.42	-13%
Industrial	361.44	299.90	344.60	377.51	16.07	4%
Cottage	10.39	9.86	8.73	8.60	-1.79	-17%
Agriculture	1.80	2.53	1.10	2.06	0.26	14%
Total Water Revenue	**715.46**	**659.01**	**656.62**	**701.15**	-14.31	-2%
Water Abstraction	**4.19**	**3.44**	**3.24**	**2.31**	-1.88	-45%
Wastewater Revenue						
Domestic	27.80	26.60	29.60	27.70	-0.1	0%
Commercial	15.50	18.50	11.00	14.37	-1.13	-7%
Industrial	1.20	1.30	0.95	0.80	-0.4	-33%
Cottage	1.0	1.0	1.0	1.0	0	0%
Agriculture	.001	.001	.008	0.11	0.1	10%
Total Wastewater Revenue	**45.50**	**47.40**	**42.55**	**43.98**	-1.52	-3%
Total Operating Revenue	**765.15**	**709.85**	**702.41**	**747.44**	-17.71	-.2%

Source: WASA

Total wastewater revenue also decreased from $45.50 million to $43.98 million for the same period. It is noteworthy that WASA's wastewater revenue from industrial, and commercial customers decreased by 33%[39], and 7% respectively[40].

As can be seen in figure 7 below, there were changes in WASA's operating revenue by customer category from year to year. Over the period 2016 to 2019, 51% of WASA's operating revenue came from its industrial customers on average. The revenue from domestic customers decreased marginally over the period from approximately 37% of operating revenue ($263.9 million) in 2016 to 35% ($245.5 million) in 2019. Operating Revenue received from commercial customers fluctuated during the period, ranging from 8% ($51.52) million in 2018 to 13% ($87.70 million) in 2017. Agriculture and Cottage customers both remained steady, comprising less than 1% of operating revenue during the period.

Figure 7: Revenue by Customer Category 2016-2019



Source: RIC derived percentages using data supplied by WASA.

[39] There was a withdrawal of a large industrial customer (Arcelor Mittal) from WASA's customer base which had previously contributed approximately $5 million in water revenue per month.
[40] WASA's water revenue is not proportional to its wastewater revenue because not all water customers are wastewater customers.

4.3.2 Total Revenue

WASA's total revenue includes other sources of income apart from those received from the sale of water, water abstraction and wastewater services. As can be seen in Table 11, these other income sources are interest income, sundry income, deferred contributions and government subventions. In every year throughout the period 2016-2019, the amount received from Government subventions exceeded WASA's operating revenues. The operating revenue ranged from 25% in 2016 to 29% of WASA's total income in 2019, whereas subventions received from the government ranged from 71% in 2016 to 69% in 2019. WASA's revenue from interest income, sundry income and deferred contributions[41] accounted for between 0.2% and 5% of total revenue over the period. Other income accounted for 71% of total revenue in 2019.

Table 11: Total Revenue

	2016	**2017**	**2018**	**2019**
	$ Mn	$ Mn	$ Mn	$ Mn
Total Operating Revenue	**765.15**	**709.85**	**702.41**	**747.44**
Other Income				
Interest Income	27.44	30.82	33.98	4.64
Sundry Income	15.04	30.32	138.81	35.97
Deferred Contributions	72.40	71.28	71.96	-
Government Subventions	2150.65	1858.32	1804.14	1773.43
Total Other Income	**2,265.57**	**1,990.75**	**2,048.89**	**1,814.05**
Total Revenue	**3,030.68**	**2,700.59**	**2,751.39**	**2,561.49**

Source: WASA

4.4 Profitability Analysis

This section focuses on WASA's profitability status for 2016-2019 using the nominal value of profit (surplus) and loss (deficit).

4.4.1 Operating Profit/Loss

Operating Profit is achieved when Operating Revenue exceeds Operating Expenditure in a particular financial year. Conversely, an Operating Loss occurs when Operating Revenue is less

[41] Interest Income includes interest received from government bonds and commercial financial institutions. Sundry Income includes disconnection fees, meter installation fees and rental income. WASA explained that Deferred Capital Contributions refer to allocations received from the Government for funding of an asset. The total capital contribution received is amortized over the life of the asset and the current depreciation expense for assets capitalized utilizing Government funds, is the amount released to income. WASA further indicated that Deferred Capital Contribution is calculated at the end of the capitalization process and reflected in Audited Financial Statements. At the time of preparing this document, WASA's 2019 audited accounts were not finalized.

than Operating Expenditure. Over the period 2016-2019, WASA's operating revenue each year was inadequate to meet its operating expenses, therefore, WASA consistently experienced an operating loss. This is seen in table 12 below. This operating deficit position worsened over the period from $1.54 billion in 2016 to $1.63 billion in 2019. The cumulative operating deficit of WASA for 2016-2019 was $6.7 billion. This situation places a strain on the national treasury when government subventions to the utility have to be increased.

Table 12: Operating Profit/Loss

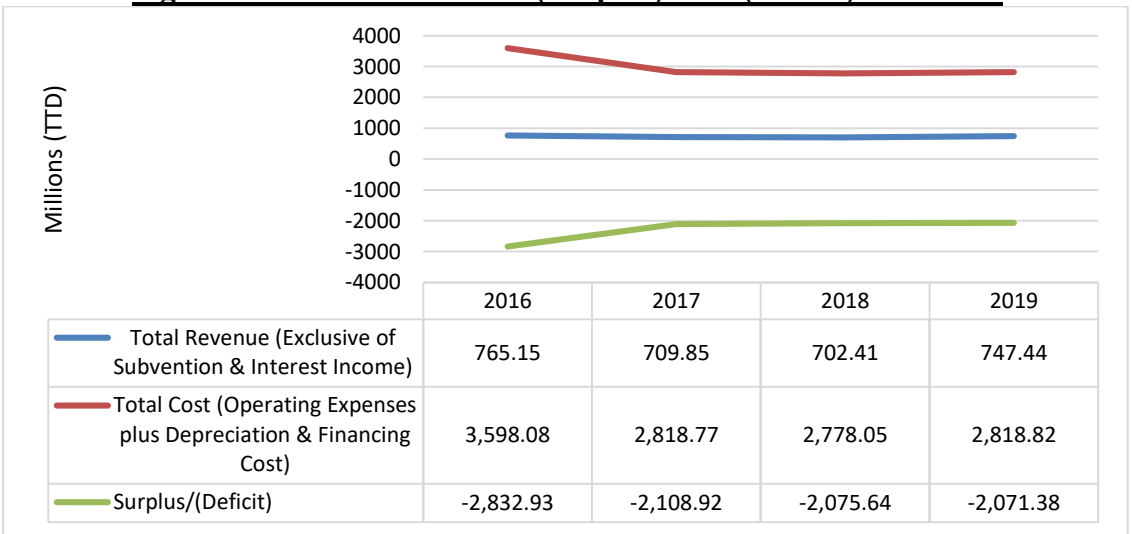
	2016	2017	2018	2019
	$Mn	$Mn	$Mn	$Mn
Total Operating Revenue	765.15	709.85	702.41	747.44
Total Operating Expenditure	2,306	2,326	2,300	2,380
Operating Profit/(Loss)	-1,540.85	-1,616.15	-1,957.19	-1,632.56

Source: WASA

4.4.2 Net Profit/Loss[42]

WASA's Operating Revenue and Total Expenditure (inclusive of non-operating expenditure) for the period 2016 -2019 is seen in figure 8 below. WASA's Total Expenditure decreased from $3.6 billion in 2016 to $2.8 billion in 2019 while operating revenue decreased from $765 million to $747 million over the four-year period. As a result, WASA has been in a significant deficit position for each year over the period under consideration.

Figure 8: WASA's Net Profit (Surplus)/Loss (Deficit) 2016-2019



[42] Under normal circumstances, Net Profit (Surplus)/ Loss (Deficit) is the difference between Total Revenue and Total Expenditure. The RIC has opted to use Revenue from sale of water and wastewater services (operating revenue), in the Net Profit/Loss computation, as including Government Subventions does not give a true picture of the utility's financial health.

4.5 Receivables Analysis

Receivables refer to the difference between the total amount WASA invoiced its customers for its services and the total amount WASA collected, for a given period of time. One indicator that is usually used to measure the relative efficiency of a utility's collection practices is the "Collection Period" (i.e. Accounts Receivable in days). Delayed collections can lead to significant cash flow problems.

WASA's annual receivables by customer category is shown in table 13. There was a 26% increase in annual receivables from 2016-2019 from all of WASA's Non-Public Sector customers. Of the Non-Public Sector Debt, Domestic and Industrial debt remains the highest proportion of receivables for WASA and both significantly increased over the period by 24% and 52% respectively.

Table 13: Receivables by Customer Category

	2016	2017	2018	2019
Receivables by Customer Category	$ Mn	$ Mn	$ Mn	$ Mn
Domestic	453.18	490.53	532.97	561.65
Commercial	20.32	39.28	25.34	27.53
Industrial	33.02	30.06	41.73	50.19
Cottage	4.85	6.68	6.20	6.31
Agriculture	5.31	5.94	5.64	6.18
Total Receivables (Non Public Sector)	**516.68**	**572.49**	**611.88**	**651.86**
Public Sector Indebtedness[43]	**96.95**	**117.16**	**139.88**	**162.07**
Total Trade Debtors	**613.63**	**689.65**	**751.76**	**813.93**

Source: WASA

When receivables are compared to revenue in table 14 below, it can be seen that WASA's collection ratio[44] has deteriorated for successive years of the period under review. In 2019, the final year of the period, receivables to revenue was 87%, indicating that a substantial amount of WASA's invoices are linked to customers who do not pay on time.

[43] Includes amounts due from central government, local government and state enterprises.
[44] Collection ratio measures the amount of funds collected from the sale of water.

Table 14: Receivables (Non-Public Sector) to Revenue

	2016	2017	2018	2019
	$ Mn	$ Mn	$ Mn	$ Mn
Operating Revenue	765.15	709.85	702.41	747.44
Receivables (Non –Public Sector)	516.68	572.49	611.88	651.86
Receivables/ Operating Revenue	68%	81%	87%	87%

Source: WASA

Public entities have consistently impacted WASA's receivables position and this did not change over the period under consideration. Central Government, Local Government and State Enterprises were the major categories responsible for WASA's public sector debt over 2016-2019. Notably, during the period, WASA's public sector indebtedness from these agencies increased by 67%, from $96.95 million in 2016 to $162.07 million by the end of 2019. These amounts owed were for water and wastewater services, the processing of faecal matter and for water abstraction.

4.6 Leverage Analysis

Leverage analysis demonstrates the degree to which activities are funded by shareholder funds versus borrowed funds, disregarding any retained earnings or losses. WASA's ability to meet its financial obligations deteriorated over the period. As seen in table 15, both funds flow and cash interest coverage[45] were well outside the targeted ranges, which suggests that WASA may have experienced difficulty in meeting its finance costs. Funds from operations (FFO)[46] was negative throughout the period and thereby insufficient to match the operating expenditure demands which contributed to negative figures for the debt payback period.[47] If an organization does not have available funds, it will be unable to repay its debt. This would suggest that any debt repayment for WASA during this period was derived from sources external to the utility, which in this case

[45] Funds Flow measures the level of protection the entity has to meet its interest cost, after paying its cash operating expenses and is calculated by, (Funds from Operations + Interest) / Interest). Cash Interest Coverage is the ability to pay interest expenses from operating cash flow calculated by (Operating Cash flow / Interest Expense).
[46] Funds from operations (FFO), is a measure of the ability to pay debts using funds from operation calculated by (FFO / Debt)
[47] Debt Pay Back Period measures the length of time that the entity could retire its debt if it devoted all funds from operations calculated by, (Net Debt / FFO).

is most likely through government subventions. The loans taken by WASA to fund operations contributed to WASA's gearing ratio[48] failing to achieve the ideal target of less than 60%.

4.7 Liquidity Analysis

Liquidity analysis assesses the ability of an organization to pay its bills in a timely manner. This analysis is important for lenders and creditors, who want to gain some idea of the financial status of a borrower (or customer) before granting them credit. The first step in liquidity analysis is to calculate the organization's current ratio. The current ratio shows how many times over the organization can pay its current debt obligations based on its current assets.[49]

According to the indicators presented in table 15, WASA was unable to achieve a stable liquidity position during the period 2016 to 2019. In 2016, the current ratio was at its highest value of 0.20:1, which is significantly below the acceptable target of 2:1. By the end of 2019 the current ratio had deteriorated to 0.16:1. The cash flow from operations ratio, which compares net sales to operating costs remained well below acceptable levels for the entire period.

4.8 Efficiency Analysis

Efficiency ratios are used to analyze an organization's ability to effectively employ its resources, such as capital and assets, to produce revenue. The ratios serve as a comparison of expenses incurred to revenues generated, essentially reflecting the level of revenue or profit an organization can generate from the amount it spends to operate its business.

As seen in table 15, WASA's debt collection ratio declined from 57% in 2016 to 40% in 2019.

The working capital ratio decreased from 0.42 in 2016 to 0.31 in 2019 indicating that WASA's current assets continue to be below its current liabilities. WASA's working capital was below 1 (one) over the period 2016-2019. In essence, WASA's current assets were less than its liabilities

[48] Gearing Ratio is a measure of financial leverage, demonstrating the degree to which activities are funded by shareholder funds, versus borrowed, disregarding any retained earnings or losses and is calculated by, (Interest bearing debt/ (Interest bearing debt + Equity)

[49] Current assets represent all the assets of a company that are expected to be conveniently sold, consumed, used, or exhausted through standard business operations within one year.

for the period, which created a negative effect on its cash flow. Consequently, WASA would have encountered difficulties in paying its creditors, and covering its debts from internally generated funds.

Table 15: Summary of Financial Indicators

Financial Measure	2016	2017	2018	2019	Target[50]
Leverage					
Funds Flow Interest Cover (Times)	0.11	5.53	5.43	8.63	Between 2 to 3
Cash Interest Cover (Times)	-1.11	-6.53	-6.43	-9.63	Greater than 1
Debt Pay Back Period (Years)	-8.23	-5.30	-5.73	-5.16	Between 5 to 7
Gearing Ratio (%)	144%	148%	152%	160%	Below 60%
FFO to Debt	-0.12	-0.19	-0.17	-0.19	
Debt Service Coverage ratio	78%	70%	85%	84%	
Liquidity					
Current Ratio	0.20	0.18	0.15	0.16	2
Cash Flow from Operations Ratio	-0.33	-0.42	-0.33	-0.33	
Efficiency					
Collection Rate (%)	57%	41%	34%	40%	
Collection Period	5.18	7.11	7.86	7.24	
Working Coverage Ratio (Times)	0.45	0.33	0.37	0.33	
Working Capital Ratio (Times)	0.42	0.30	0.30	0.31	

Source: RIC derived using data supplied by WASA.

[50] In the Regulation of Electricity Transmission and Distribution Final Determination (2006), the RIC proposed that T&TEC be broadly compliant in future, with the target value for these financial ratios.

5. RATES AND TARIFFS

5.1 WASA Tariff Schedule

WASA's current tariffs were implemented in December 1993, following the Public Utilities Commission (PUC) Order 83[51]. It was only the third time in the last sixty years that tariffs were increased, the previous times being 1937 and 1985. There are five main classes of WASA customers: domestic, commercial, industrial, cottage and agriculture for both water and wastewater services. The prevailing tariff structure that applies to these customers is shown in tables 16 and 17 for water and wastewater respectively.

Residential water customers and charitable institutions both fall into the domestic customer class and are billed quarterly. Internally serviced unmetered residential customers are charged based on the annual taxable value of their property while internally serviced metered residential customers are charged under an inclining block[52] structure consisting of two tariff bands. Charitable institutions which are metered are charged under the same inclining block structure as internally serviced metered residential customers, while those that are unmetered are charged a flat rate per cubic meter consumed. Residential customers with access to water via a standpipe or who are externally serviced via a yard tap are charged fixed monthly bills.

All non-domestic customers are billed on a monthly basis. Unmetered industrial and commercial customers pay a fixed rate while for those that are metered a flat rate is applied to per cubic meter consumption. Unmetered cottage customers are charged a fixed monthly bill, while those that are metered are charged under an inclining block structure with two consumption bands. Unmetered agriculture customers are charged based on the annual taxable value of their property, while for those that are metered, a flat rate is applied for each cubic meter consumed.

[51] The Public Utilities Commission was the predecessor to the RIC.
[52] Inclining block rate tariff structure is commonly used to charge for water usage. The feature of this tariff structure is that the more one uses, the higher the average price.

Table 16: WASA's Current Tariffs for Water Services

Customer Class	Category	Metered Charges		Unmetered		
		TT m^3 /qtr	Min. charge			
DOMESTIC:						
Standpipe	A_1			$33.75/qtr		
Externally serviced	A_2			$67.50/qtr		
Internally serviced (Unmetered)	A_3			ATV (TT$)	% ATV	Minimum TT$/qtr
				0–500	95	108
				501 – 1000	81	118
				1001 – 2000	54	203
				over 2000	47	270
					Maximum charge 304/qtr	
Internally serviced (Metered)	A_4	$1.75 first 150$m^3$, then $3.50	$30/qtr			
Charitable institutions	A_5			$108/qtr		
Charitable institutions (Metered)	A_6	$1.75 first 150$m^3$, then $3.50	$30/qtr			
NON-DOMESTIC:						
Industrial	B_3			$474/mth		
Industrial (Metered)	B_4	$3.50 per m^3	$35/mth			
Commercial	C_3			$474/mth		
Commercial (Metered)	C_4	$3.50 per m^3	$35/mth			
Cottage	D_3			$300/mth		
Cottage (Metered)	D_4	$2.50 first 150$m^3$, then $3.50	$25/mth			
Agricultural	E_3			15% of ATV Min. charge: $105/mth		
Agricultural (Metered)	E_4	$2.25 per m^3	$20/mth			
Unserviced premises	F			$50/mth		
OTHER: Swimming pool				$160/qtr		
Building tap:						
Domestic		A_4 charges		or A_3 charges		
Non-Domestic		B_4 , C_4, charges		or B_3 or C_3 charges		

Source: Tariff Book to PUC Order 83.

Subsequent to the last rate adjustment for WASA, the Water Improvement Rate (Point Lisas Industrial Estate) Order, 1998 allowed for a special water improvement rate of an additional $4.00 per cubic meter to be implemented at the Point Lisas Industrial Estate. As a result, customers on the Estate paid $7.50 per cubic meter from June 24, 1998 to December 31, 2011.

The Water Improvement Rate (Point Lisas Industrial Estate) (Variation) Order, 2011 increased the water improvement rate, from $4.00 per cubic meter to $8.50 for industries on the Point Lisas Industrial Estate. Consequently, customers on the Estate have been paying $12.50 per cubic meter since January 1, 2012.

Wastewater customers are charged either a fixed percentage of their water bills or a fixed quarterly or monthly bill is applied for domestic and non-domestic customers respectively.

Table 17: Current Tariffs for Wastewater Services

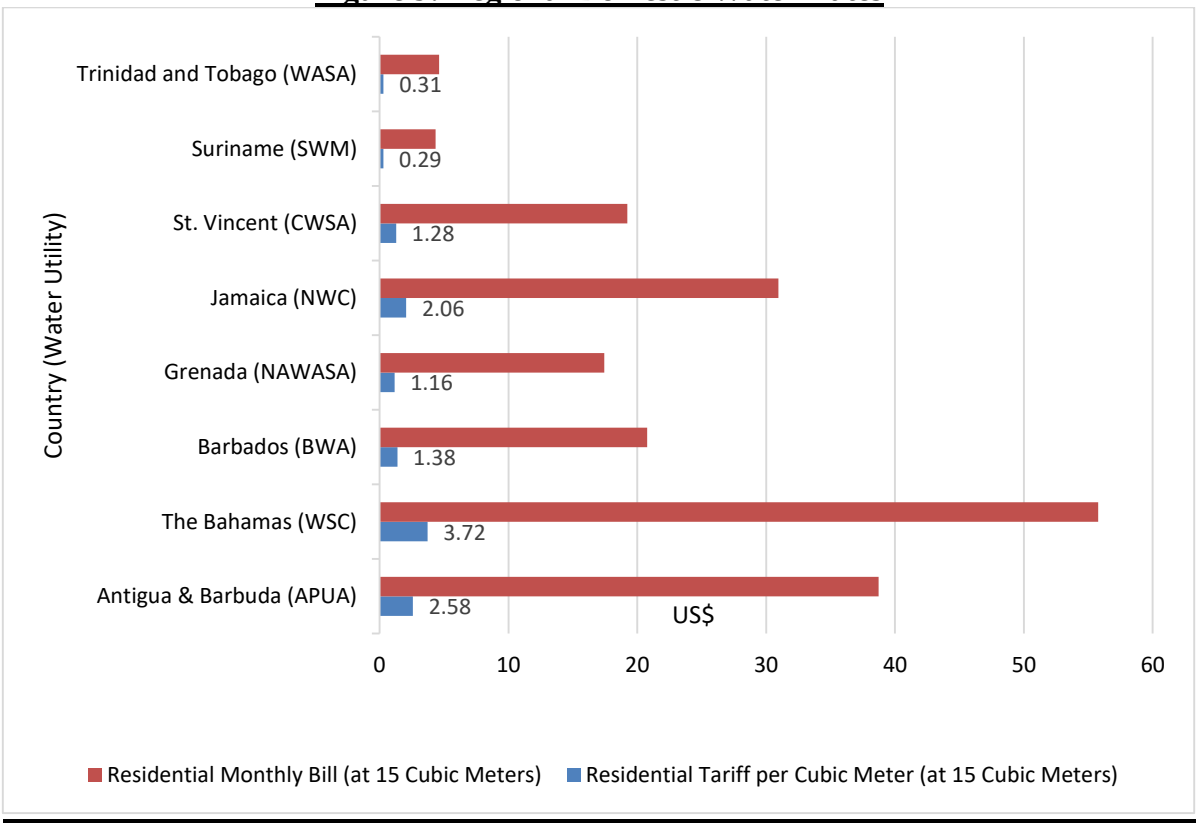
Customer class	Category	Metered Charges	Unmetered
DOMESTIC:			
Internally serviced	A3		Water bill<$202.50/qtr, $75.50/qtr Water bill>$202.50/qtr, $93.25/qtr
Internally serviced (M)	A4	50% of water bill/qtr	
Charitable institutions	A5		$75.50/qtr
Charitable institutions (M)	A6	50% of water bill/qtr	
NON-DOMESTIC:			
Industrial	B3		$237/mth
Industrial (M)	B4	50% of water bill	
Commercial	C3		$237/mth
Commercial (M)	C4	50% of water bill	
Cottage	D3		$150/mth
Cottage (M)	D4	50% of water bill	
Agricultural	E3	50% of water bill	
Agricultural (M)	E4	50% of water bill	

Source: Tariff Book to PUC Order 83.

5.2 Comparison of Water Tariffs - Selected CARICOM Countries

Figure 9 below presents a domestic tariff comparison for regional utilities and the associated monthly bill based on a 15 cubic meter consumption level. On the basis of the data presented in this figure, Trinidad and Tobago has the second lowest tariffs, with Suriname having the lowest water tariffs among the observed regional countries.

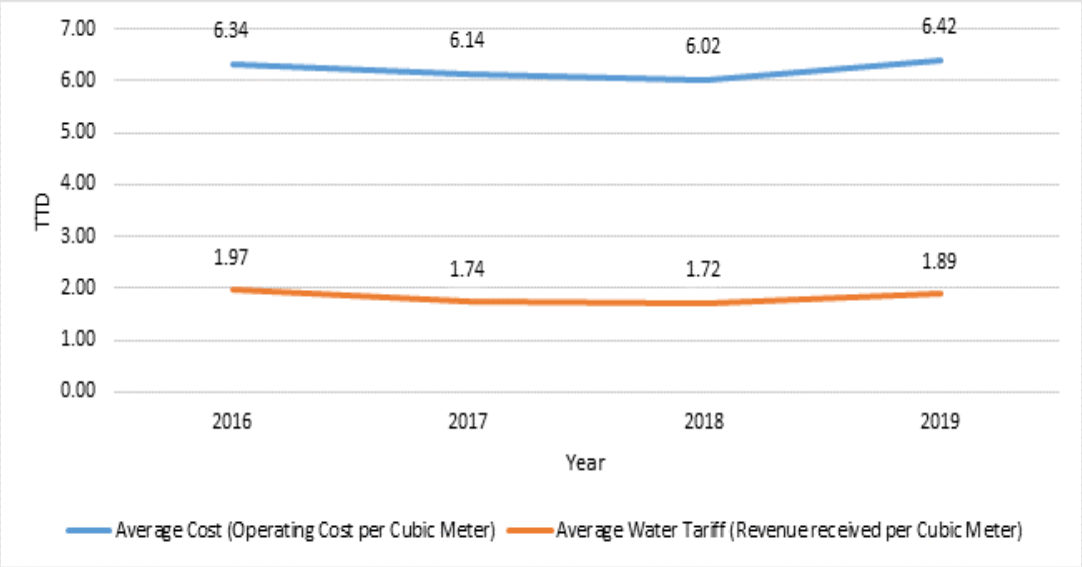
Figure 9: Regional Domestic Water Rates



Source: IBNet Tariffs Database (Rates displayed above were derived from the most recent IBNet data available on the utilities therein).

From figure 9 above it can be seen that WASA's domestic customers pay significantly lower bills than those in most other CARICOM jurisdictions with the exception of Suriname. The disparity between a monthly domestic customer's bill in Trinidad and Tobago and a customer's bill in the Jamaica for example, is approximately US$ 26.00 at a 15 cubic meter consumption level.

Figure 10: Average Water Tariff and Average (Operating) Cost per cubic meter produced



Source: RIC derived using data supplied by WASA.

WASA's average water tariffs, and average (operating) cost per unit of water produced over the 2016-2019 period are presented in figure 10 above. Over the period 2016 to 2019, WASA's average tariff per cubic meter produced was within the range of TT$1.72 in 2018 to TT$1.97 in 2016 while average cost varied from TT$6.02 in 2018 to TT$6.42 in 2019.

This excess of operating cost per cubic meter over the average water tariff highlights the utility's inability to recover operating cost from revenues.

6. SUMMARY & CONCLUSION

Summary

This document provided an overview of the water and sewerage sector in Trinidad and Tobago as well as an operational and financial assessment of the Water and Sewerage Authority (WASA) for the period 2016-2019. The assessment of WASA's operational efficiency focused on service delivery capability, quality of service to its customers and efficiency in the use of resources to achieve organizational objectives. An analysis was also done on WASA's financial statements, to assess WASA's ability to control its costs as well as to measure key areas of its commercial practices over the period.

Service delivery capability indicators include water coverage, wastewater coverage and demand-supply balance. Water coverage in 2018 was estimated to be 94% indicating that 6% of the population was without reasonable access to potable water. With respect to wastewater coverage, in 2019, WASA estimated that approximately 35% of the population is served by its wastewater facilities, therefore, the majority of the population (65%) utilized other methods, including septic tanks. The demand-supply balance assesses the adequacy of the water supply to satisfy demand. On average, demand exceeded supply by 38 million cubic metres per annum over the period 2016-2019, with the largest difference of 42 million cubic metres occurring in 2019. WASA estimated per capita demand to be 440 litres per person per day, which is notably higher than the per capita demand than most countries within the region.

Quality of Service indicators include service continuity and treatment of customer complaints. In terms of continuity of water supply, the percentage of the population served with a 24-hour/7 days per week supply decreased from 52% in 2016 to 41% in 2019, according to WASA. Therefore, there appeared to be a worsening position in terms of the population in receipt of a 24-7 supply. The number of customer complaints is indicative of consumers' dissatisfaction with the quality of service provided by WASA and the treatment of those complaints are an indicator of the utility's responsiveness. The number of customer complaints made to WASA over the period 2016-2019 reduced by 55% and 21% for new billing complaints and new wastewater services complaints respectively. Conversely, there was a 17% increase in new water service complaints over the period.

Efficiency indicators include the level of Non-Revenue Water (NRW), the number of leaks per length of distribution pipeline, the metering penetration level and staffing ratios. WASA estimated its NRW to be 53% in 2019 and this compares unfavourably to the World Bank benchmark for a reasonable NRW level for developing countries is 20-24%. Interestingly, a 2018 study showed that Jamaica, Barbados and Guyana had higher NRW levels than Trinidad and Tobago. Pipe Network Performance is an efficiency and reliability metric that has a positive relationship with the level of NRW. WASA reported in 2019, that 53% of its pipelines were in good condition with 4.3 pipe breaks per km of pipeline per year, as compared to less than one pipe break per km of distribution line per year for well-maintained utilities. The level of metering is another operational performance indicator that measures service quality. In 2019, WASA's metering of industrial customers and commercial customers was the highest, at 82% and 60% respectively. WASA's metering of residential customers was abysmally low at 3%. In terms of staffing levels, WASA's staff per 1000 connections was constant at 13 staff per 1,000 connections whereas the best practice for well managed utilities in developing countries is between 4-6 staff per 1,000 connections.

An analysis of WASA's financial position and its financial performance over the years 2016 to 2019 was also presented in this report. WASA's total expenditure decreased from $3.6 billion in 2016 to $2.8 billion in 2019 with operating expenses accounting for 84.4% of total expenditure in 2019. Total revenue decreased from $3 billion to $2.6 billion between 2016 and 2019. Operating revenue averaged 27% of total revenue over the four-year period while Government subventions accounted for an average of 70% of total revenue over the period. Even though there was an overall decrease in total expenditure, a net loss was recorded over the four years, amounting to $2.8 billion in 2016 and decreasing to $2.1 billion in 2019.

In terms of tariffs, WASA's current tariffs were implemented in December 1993, following the Public Utilities Commission (PUC) Order 83. A domestic tariff comparison for regional utilities and the associated monthly bill based on a 15 cubic meter consumption level showed that WASA's domestic customers pay significantly lower bills than those in most other CARICOM jurisdictions. Over the period 2016 to 2019, WASA's average tariff per cubic meter produced was within the range of TT$1.97 in 2016 to TT$1.72 in 2018, while average cost per cubic meter varied from TT$6.02 in 2018 to TT$6.42 in 2019. This excess of average cost per cubic meter over the average water tariff highlights the utility's inability to recover operating cost from revenues.

Conclusion

The review of the operational and financial state of WASA over the 2016-2019 period reveals that there was a deterioration in most aspects of WASA's performance. WASA's financial performance got progressively worse over the period. At the end of 2019, a sizeable financial deficit was recorded. While there were improvements in some of the utility's operational performance indicators, WASA's overall financial and operational performance were well below the internationally accepted levels for a well performing water utility. Indeed, radical changes are needed if WASA is to improve its performance going forward.

The RIC recently commenced the first price review for WASA and will address some of the observations coming out of this document in its Determination.