

**BUENOS AIRES WATER SUPPLY AND SANITATION WITH A FOCUS ON VULNERABLE AREAS  
PROGRAM (PROGRAM-FOR-RESULTS) (P172689)**

# TECHNICAL ASSESSMENT

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## Acronyms

ACUMAR	Matanza-Riachuelo River Basin Authority ( <i>Autoridad de Cuenca del Río Matanza-Riachuelo</i> )
APLA	Planning Agency ( <i>Agencia de Planificación</i> )
AySA	Buenos Aires water and sewerage utility ( <i>Agua y Saneamientos Argentinos</i> )
BABE	Burst and Background Estimate methodology
BESS	Battery Energy Storage Systems
BNR	Biological Nutrient Removal
CABA	Autonomous City of Buenos Aires ( <i>Ciudad Autónoma de Buenos Aires</i> )
CAF	Development Bank of Latin America ( <i>Corporación Andina de Fomento</i> )
CAIU	Comprehensive Customer Service Center ( <i>Centro de Atención Integral al Usuarios</i> )
CAPEX	Capital Expenditures
COFES	Federal Sanitation Entities Committee ( <i>Comité Federal de Entidades de Saneamiento</i> )
CPF	Country Partnership Framework
CRM	Customer Relationship Management
DLI	Disbursement-Linked Indicator
DMA	District Metered Area
E&S	Environmental and Social
EIAP	Efficiency Improvement Action Plan
EIRR	Economic Internal Rate of Return
ERAS	Regulation agency for water and sanitation ( <i>Ente Regulador de Agua y Saneamiento</i> )
ESSA	Environmental and Social Systems Assessment
FSA	Fiduciary Systems Assessment
FUTRASAFODE	Sanitation Workers' Foundation for Training and Development ( <i>Fundación de los Trabajadores Sanitaristas para la Formación y el Desarrollo</i> )
GBA	Greater Buenos Aires
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoA	Government of Argentina
HACCP	Hazard Analysis Critical Control Point
HDPE	High-Density Polyethylene
HH	Household
IBRD	International Bank for Reconstruction and Development
IDB	Inter-American Development Bank
IP	Internet Protocol
IVR	Interactive Voice Response
IWA	International Water Association
LAC	Latin America and Caribbean
KPI	Key Performance Indicator
MH	Ministry of Economy ( <i>Ministerio de Hacienda</i> )
MRB	Matanza-Riachuelo Basin
NPV	Net Present Value
O&M	Operation and Maintenance
OPEX	Operational Expenditures
PAP	Program Action Plan
PBA	Province of Buenos Aires
PCU	Program Coordination Unit

PMOEM	Improvement, Operations, Expansion and Maintenance Plan ( <i>Plan de Mejoras, Operación, Expansión y Mantenimiento</i> )
PNAPyS	National Plan for Drinking Water and Sanitation ( <i>Plano Nacional de Agua Potable y Saneamiento</i> )
PPE	Emergency and Prevention Plan ( <i>Plan de Prevención y Emergencias</i> )
PQRS	Question-Complaint-Claim and Suggestion system ( <i>Pregunta, Queja, Reclamo y Sugerencia</i> )
PRV	Pressure Reducing Valve
RENABAP	National Register of Low-Income Neighborhoods ( <i>Registro Nacional de Barrios Populares</i> )
SCD	Systematic Country Diagnostic
SSO	Works Monitoring System ( <i>Sistema de Seguimiento de Obras</i> )
UREM	Emergent Urbanizations ( <i>urbanizaciones emergentes</i> )
VA	Verification Agent
VSP	Variable Speed Drive
WBE	Wastewater-Based Epidemiology
WBG	World Bank Group
WSS	Water Supply and Sanitation
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

## PART A – STRATEGIC RELEVANCE AND TECHNICAL SOUNDNESS

### 1 Program Description and Strategic Relevance

#### 1.1 National Context

1. **The COVID-19 outbreak has hit Argentina’s economy at a moment of significant macroeconomic imbalances and social stress.** Following a two-year recession, high inflation, and lack of access to capital markets, the strict lockdown to contain the spread of the pandemic triggered the sharpest Gross Domestic Product (GDP) decline ever recorded, in March-April of 2020. The gradual easing of confinement measures has allowed economic activity to slowly pick up pace since the third quarter, but has also set off a rapid rise in COVID-19 cases. The implementation of a fiscal stimulus package – worth 3.5 percent of GDP - coupled with an abrupt decline in revenues resulted in a central government deficit of nearly 7 percent of GDP in 2020, the largest in more than 30 years. Lack of market access mandated a full monetization of the deficit, which is exacerbating macroeconomic imbalances: the gap between official and parallel foreign exchange rates is at historic high levels and the Central Bank has rapidly lost reserves as it attempted to maintain the official exchange rate stable, despite a trade surplus and tight currency controls.

2. **As a result of higher inactivity rates and decreasing purchasing power, Argentina’s poverty rate increased from 35 to 41 percent in the first half of FY2020, with 11.7 million people now living below the poverty line and 3 million in extreme poverty.** More than half of Argentina’s poor live in Greater Buenos Aires (*Gran Buenos Aires, GBA*), by far the greatest concentration of urban and peri-urban poverty in the Southern Cone of Latin America.<sup>1</sup> With 15.4 million inhabitants, GBA is one of Latin America’s urban giants, accounting for one third of Argentina’s population and nearly half of its GDP.<sup>2</sup> Although urbanization has contributed to economic growth and improved living standards for millions of people, it has not always been accompanied by adequate planning and investment in infrastructure and services, leading to “pockets of poverty.” At the close of second semester 2019, the percentage of people living in poverty and indigence in GBA was already considerable, standing at 35.2 and 9.3 percent, respectively. The outbreak of the COVID-19 pandemic raised these figures to 41.6 percent and 11.7 percent.

3. **In GBA, which is ground zero for the COVID-19 pandemic in Argentina, low-income neighborhoods are being hit the hardest by the sanitary and economic crises.** There are three main factors driving the high vulnerability of GBA’s poor: crowded living conditions; high dependence on informal economic activities, which undermines compliance with lockdown policies; and lack of access to safely managed water supply and sanitation (WSS), all of which are key to preventing virus transmission. Over 30 percent of these neighborhoods are in flood-prone areas, rendering existing informal and often unsafe WSS systems even more prone to failure.<sup>3</sup> Furthermore, a methodology prepared by the World

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<sup>1</sup> GBA comprises the capital of Buenos Aires and 24 municipalities of the Province of Buenos Aires: Avellaneda, General San Martín, Hurlingham, Ituzaingó, José C. Paz, Lanús, Lomas de Zamora, Malvinas Argentinas, Morón, Quilmes, San Isidro, Tres de Febrero, Vicente López, Almirante Brown, Berazategui, Esteban Echeverría, Ezeiza, Florencio Varela, La Matanza, Merlo, San Fernando, San Miguel, and Tigre.

<sup>2</sup> Source: National Institute of Statistics and Census (*Instituto Nacional de Estadísticas y Censo, INDEC*), 2010 census (the latest official data).

<sup>3</sup> Results of Fathom flood modeling at 90 m resolution, using location of Buenos Aires peri-urban slums from the National Registry of Vulnerable Neighborhoods (*Registro Nacional de Barrios Populares, RENABAP*) registry.

Bank to predict contagion hotspots for COVID-19 in cities uses access to WSS and population density as the main identification criteria<sup>4</sup>.

## 1.2 AySA and its specific challenges

4. **Agua y Saneamientos Argentinos (AySA) is the largest water utility in the country, and the concessionaire responsible for providing WSS services to most of the GBA.** It is one of the largest WSS utilities in the world, with a population of 14.4 million residents in its service area (96 percent of the GBA population). It is estimated that 66 percent of the population without access to piped water in Argentina and 39 percent without access to sewerage live in this area. The concession area is divided into two clearly differentiated zones: the Autonomous City of Buenos Aires (CABA as per the Spanish acronym), with high levels of drinking water and sewerage coverage, and the suburbs, made up of municipalities from the Province of Buenos Aires (PBA), with lower service coverage. Many of the unserved residents live in *fragile neighborhoods*<sup>5</sup>, and the incorporation of nine new municipalities to AySA's concession area since 2016 has lowered AySA's overall access rates (as described in **Error! Reference source not found.**). The inclusion of the new municipalities also introduced operational challenges for the utility, which was forced to adapt to the organizational structures, systems and procedures that were established by the previous service providers. As also illustrated in the table below, the evolution of coverage levels in the last 15 years has been limited.

Table 1. Evolution of AySA's service area coverage rates between 2006 and 2018.<sup>6</sup>

Department	Population		Water Coverage (%)			Sewerage Coverage (%)		
	2010	2018	2006	2010	2018	2006	2010	2018
<b>AySA's initial service area</b>	<b>10,390,843</b>	<b>11,160,191</b>	<b>74.9</b>	<b>82.8</b>	<b>84.7</b>	<b>54.0</b>	<b>56.4</b>	<b>61.8</b>
CABA	3,028,481	3,068,043		97.3	97.2		93.9	96.2
17 initial PBA's municipalities	7,362,362	8,092,148		76.8	79.9		41.0	48.8
9 new PBA's municipalities	2,878,386	3,281,231		38.3	40.2		15.4	23.3
<b>AySA's current service area</b>	<b>13,269,229</b>	<b>14,441,422</b>		<b>73.1</b>	<b>74.6</b>		<b>47.5</b>	<b>53.1</b>

5. **Since 2006, AySA has focused considerable attention on expanding access to WSS in the peri-urban municipalities, however, connectivity rates remain low among poor households.** From 2015 to 2019, AySA has installed 68 secondary drinking water and 144 secondary sewerage networks throughout 16 municipalities of its concession area, benefitting 166,880 and 635,089 residents respectively.<sup>7</sup> However, recent surveys carried out by AySA reveal that only 83.2 percent of households (HH) had connected to the water network and that roughly 50 percent of these connections were either incomplete

<sup>4</sup> [Cities, crowding and the coronavirus: Predicting contagion risk hotspots \(2020\)](#).

<sup>5</sup> There are more than 1,000 fragile neighborhoods in AySA's service area, commonly referred to as informal settlements or slums. These are classified by AySA as *Urbanizaciones Emergentes* (UREM), which include neighborhoods recognized under the National Survey of Low Income Neighborhoods (RENABAP) (Decree 358/2017). These UREMs are characterized by varying degrees of land tenure, overcrowding, and overriding deficiencies in access to basic public services. Furthermore, some peripheral areas, identified as ABC (*Áreas de Baja Consolidación*) have also been identified as fragile neighborhoods, as they also present social vulnerabilities associated with low educational levels, high levels of dependency and low insertion in the formal labor market that lead to an overall socio-economic fragility.

<sup>6</sup> AySA Annual Report (2017) and WBG Water coverage by network and sewerage estimated by the World Bank team at the first quarter of 2018 based on INDEC, Permanent Household Survey (EPH) and Annual Urban Household Survey (EAHU)

<sup>7</sup> The works benefitted the 16 municipalities of Almirante Brown, Avellaneda, Esteban Echeverría, Ezeiza, Hurlingham, Ituzaingó, La Matanza, Lanús, Lomas de Zamora, Morón, Quilmes, San Fernando, San Isidro, San Martín, Tigre and Tres de Febrero.

or poorly installed.<sup>8</sup> Similarly, only 77.2 percent of HH had connected to the sewage network. AySA has a strong track record of supporting “last mile connectivity” in vulnerable neighborhoods. Since 2010, it has partnered with municipalities and municipal labor cooperatives in implementing the Water and Jobs (*Agua más Trabajo*, A+T) and Sewerage and Jobs (*Cloaca más Trabajo*, C+T) programs, which have been successful in increasing intra-HH connectivity rates, particularly in the vulnerable peri-urban neighborhoods of the GBA. The A+T and C+T programs not only improve the quality of life and reduce water, sanitation, and hygiene (WASH)-related health risks, but reduce local unemployment through participation in municipal cooperatives, generating income opportunities and promoting social inclusion.<sup>9</sup>

**6. Untreated wastewater continues to pose significant environmental and health concerns.** According to AySA, the utility has a capacity to treat 2.8 million m<sup>3</sup>/day of wastewater, corresponding to the share of the population connected to sewerage. Of the treated effluent, only 26 percent of the wastewater receives secondary treatment. The remaining wastewater is only pretreated and predominantly released into the Rio de la Plata<sup>10</sup>. Effluents from more than 6 million people not connected to sewers are often inadequately disposed of, polluting aquifers or discharged into urban waterways, creating public health concerns for those living along the riverbanks.

**7. The risk to public health is compounded by floods characterized by increased frequency and intensity due to climate change.** Between 2000 and 2011, flooding events affected 5.5 million people and caused nearly US\$4.5 billion in losses. Although new interventions are increasingly protecting the population from flooding events, the risk remains significant, particularly in peri-urban areas. More than one million people in the metropolitan area of BA are exposed to floods with a return period of 5 years, and a more than 30 percent of informal and fragile settlements are exposed to 100-year return period floods<sup>11</sup>.

**8. Public health concerns can also be traced to the widescale lack of sewerage connections and the use of unsafe groundwater.** Numerous peri-urban areas use groundwater polluted by years of poorly managed on-site HH sanitation solutions, and as a result, nitrate concentrations in piped water can surpass national regulatory limits. Such is the case for the estimated 100,000 residents of Florencio Varela, most of whom are vulnerable and exposed to unsafe water, underscoring the urgent need for AySA to increase the quality and safety of water services in this area. Similarly, there is a pressing need for the utility to provide residents of the Escobar, Esteban Echeverría, Ezeiza, San Fernando, San Isidro, San Martín, and Tigre municipalities access to safely managed sanitation services by ensuring both adequate sewage treatment and that associated discharges are in compliance with regulatory standards.

**9. There is considerable scope to reduce AySA’s operation and maintenance (O&M) costs and increase its operational efficiency.** AySA posts 35 percent more network breakages due to an aged water

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<sup>8</sup> Gerencia de Promoción Comunitaria, Dirección de Desarrollo de la Comunidad (2016). Relevamiento conexas a la Red de Agua Potable, Informe Final 2014. AySA. *Figures extrapolated based on random sampling data from three municipalities: Almirante Brown, Morón y Lomas de Zamora.*

<sup>9</sup> As of December 2019, a total of 905 works comprising 3,321 kms of pipelines and 307,903 household connections were completed generating over 912 jobs in municipal cooperatives. Source: *AySA Plan Agua + Trabajo y Cloaca + Trabajo.*

<sup>10</sup> AySA is in the process of significantly increasing its wastewater treatment capacity through the construction of large infrastructure works in the Riachuelo system (collector and WWTP with subfluvial outfall) and in Berazategui (subfluvial outfall from the Bicentenario WWTP).

<sup>11</sup> Results of Fathom flood modeling at 90 m resolution (simulating fluvial and pluvial floods), using location of Buenos Aires peri-urban slums from the RENABAP registry.

network, 8 percent more water losses and produces 74 percent more water per person<sup>12</sup> than similar utilities in Latin America and the Caribbean (LAC),<sup>13</sup> signaling the need to reduce non-revenue water (NRW), estimated at 41 percent<sup>14</sup> (37 percent of which is attributable to physical losses) through network rehabilitation and upgrading. These indicators are also associated with high levels of energy consumption given the need to pump higher than needed volumes of water,<sup>15</sup> and low micro-metering coverage throughout AySA's concession area, which stands at approximately 17 percent -- a quarter of the level of main regional utilities.<sup>16</sup> On the sewerage front, AySA posts 361 percent more network blockages and 194 percent more breakages than regional comparators.<sup>17</sup> In 2019, revenues only covered 75 percent of O&M costs (91 percent without considering amortization expenses). This gap, together with new infrastructure investment needs, were financed by short-term debt and transfers from the National Government (US\$450 million), equivalent to 80 percent of AySA's total revenues.

**10. The COVID-19 crisis has imposed additional cashflow constraints, straining AySA's financial situation.** Widescale job loss has curtailed consumer ability to pay water and sewerage bills, thereby reducing revenues for AySA, as demonstrated by a 30-40 percent decrease in revenues during the first two months of the pandemic. Concurrently, increased emergency response expenses associated with, inter alia, delivering drinking water in trucks and boats, investments in safety gear and measures for frontline operators and staff at risk of contagion, remote work and other adaptation measures, have further increased the utility's O&M costs. The combination of these factors coupled with a freeze on tariffs following the outbreak, has resulted in cash liquidity issues and is expected to decrease AySA's cost recovery rate to 47 percent in 2020. Although AySA has introduced measures to tackle these challenges, such as the promotion of online payment options, and is receiving extra support from the government, more robust actions are needed to reduce the cashflow gap.

**11. To capitalize on experience gained through its COVID-19 response, AySA needs to systematically draw lessons from this crisis and incorporate innovative digital solutions to further improve emergency preparedness and resilience.** Despite relying on an established Emergency and Prevention Plan (PPE or *Plan de Prevención y Emergencias*), and having responded swiftly to the COVID-19 crisis with a package of measures, including wastewater-based epidemiology (WBE), AySA has yet to consolidate this knowledge and incorporate it into its PPE to strengthen preparedness to future epidemiological disruptive events. In addition, AySA has yet to tap into the full potential of digital solutions for post-COVID-19 recovery and seek opportunities to enhance its ability to apply data science and augmented intelligence techniques to its business, commercial and technical challenges. AySA presents low levels of digitalization of commercial processes compared to its regional peers (SABESP, COPASA, EPM, Aguas Andinas or SEDAPAL) and is one of the few large utilities in the region today that lacks the ability to interact with its customers through a digital platform. For example, 90 percent of claims are currently received by telephone, 54 percent of payments are made through in-person interactions, and most management and procedures are

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<sup>12</sup> This translates into a production of 550 L/person/day. PMOEM 2019-2023.

<sup>13</sup> Based on a set of 35 regional utilities included in benchmarking reports produced by the Water and Sanitation Regulator (ERAS).

<sup>14</sup> This is an estimate provided by AySA, given the low macro and micro metering rates.

<sup>15</sup> Energy costs represent 10 percent of AySA's O&M or about 50 percent of O&M if the cost of personnel is excluded.

<sup>16</sup> Micro-metered rates in main regional WSS providers: AySA-Buenos Aires (23 percent), Acueducto-Bogotá (45 percent), IDAAN-Panamá (52 percent), SEDAPAL-Lima (87 percent), Aguas Andinas-Santiago de Chile (96 percent), EPMAQS-Quito (99 percent), SABESP-São Paulo (99 percent).

<sup>17</sup> ERAS 2018 Report, data from 2017.

conducted using traditional paper files. These approaches are associated with higher bureaucracy, slower processing times, and reduced agility in responding to crises.

12. **AySA lags behind in terms of female participation in executive positions, which is widely recognized as a key contributor to improved financial performance<sup>18</sup> and is particularly crucial in times of crisis.** Currently, 22 percent of managers at AySA are women, which is well below the regional average of 35 percent.<sup>19</sup> Contributing to this gap is the fact that women are promoted at lower levels – only 18.5 percent of promotions to managerial positions were granted to female staff in the past year. AySA has already adopted a variety of measures during the pandemic to prevent broadening of existing gender gaps and is committed to promoting female career advancement opportunities to improve its operational and financial performance and crisis response capacities going forward.

### *1.3 Rationale for Government Intervention*

13. **The links between human capital and the lack of access to WSS services are evident and the COVID-19 pandemic has highlighted these links:** vulnerable communities without access to WSS services are at an increased risk of contracting the virus due to the lack of handwashing and hygiene options. Moreover, data prior to the global pandemic indicates that, in Argentina, the equivalent of more than 10,000 years of life is lost each year due to premature deaths or disabilities caused by the lack of access to drinking water (85 percent of cases) or inadequate sanitation (15 percent of cases). Thus, safely connecting vulnerable households to the networks will yield benefits for public health, human capital and the environment which are aligned with the commitment to achieve the SDGs.

14. **Concurrently, the additional connections will support AySA's operational and commercial efficiency and financial sustainability.** By connecting the unconnected, AySA will reduce system losses and increase its revenues from a larger base of paying customers, and this increased efficiency will lead to fewer transfers from the central government. Another element that could reduce AySA's dependency on national transfers is a shift in the type of investment. Historically, government investments have predominantly focused on new expansions of the network. However, investments tailored to improve the water operators' efficiency can reduce the need for national transfers while also deliver better services.

### *1.4 The Service Improvement, Expansion, Operation and Maintenance Program (PMOEM)*

15. The PMOEM serves as AySA's default masterplan and is grounded in fulfilling commitments under the sector's regulatory framework, the sectoral policy established under the National Plan for Drinking Water and Sanitation (*Plan Nacional de Agua Potable y Saneamiento*, PNAPyS) and the SDGs, including securing 100 percent access to water and 75 percent access to sewerage services throughout Argentina's urban areas by 2030. It is revised every five years based on progress made and evolving priorities. The current program covers the period 2019-2023 and builds on the first two PMOEMs (2010 and 2015). The PMOEM comprises three Sub-programs together with associated operational expenses:

- **Sub-program 1: Improvements and Expansion.** This Sub-program is a technical guide with a 30-year planning horizon, which includes the analysis and scheduling of works needed to satisfy

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<sup>18</sup> World Bank. 2019. *Women in Water Utilities: Breaking Barriers*. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/32319>.

<sup>19</sup> World Bank Water Data. <https://wbwaterdata.org/breakingbarriers/tool/>. December 17, 2020. (Based on data from 9 LAC water utilities collected through the World Bank's HR Utility Survey including data submitted by AySA.)

current and future demand, with a focus on the newly incorporated municipalities. It is complemented by the concurrent strategies outlined in the Maintenance and Improvement Master Plan (Sub-program 2). Consequently, infrastructure incorporated in the Plan considers both the proper functioning of existing facilities and compatibility with new works in order to maintain and progressively improve the quality of the service.

- **Sub-program 2: Improvements and Maintenance.** This Sub-program focuses on water network efficiency through network rehabilitation, demand management through installation of meters and sectorization, and energy efficiency through infrastructure rehabilitation and replacement. This Master Plan has a strong focus on the efficient management of drinking water distribution through the systematic implementation of technical strategies to reduce physical losses that make it possible to optimize the supply chain, ensuring fulfillment of current and future demand for drinking water. AySA’s expected benefits include a reduction of physical losses, lower operating costs and a decrease in future network repairs thus increasing its resilience. Moreover, enforcement authority mandated a metering strategy that will increase the metered service coverage in order to generate a new culture of care and responsible use of the water service.
- **Sub-program 3: Operations.** This Sub-program seeks to improve the efficiency of internal processes through systems integration and upgrade, and to increase transparency through improvements in communication by providing the general public and stakeholders access to information. The Sub-program also includes operational expenses associated with the implementation of the overall program.

16. The next phase of the PMOEM will encompass the period 2024-2028 and is expected to give continuity to activities planned under the current version, while remaining consistent with program objectives over the course of the past 10 years.

### 1.5 Program for Results (PforR) – the Program

17. The Program will span the planning cycle of two PMOEMs, namely the current one (2019-2023) and the one for the following quinquennial (2024-2028), and will support the implementation of highly relevant areas of these PMOEMs as well as operational expenditures corresponding to the infrastructure under the Program. The PMOEM includes all interventions to expand and improve WSS services and increase AySA’s operational efficiency and improve the quality of its operations. The Program will support activities according to three Results Areas (RA) with well-designed geographical and thematic boundaries. The Program’s financing structure is shown in Table 2 and includes:

Table 2. Budget for the program, the Program, and the PforR

PMOEM Sub-Program / Result Area	Total PMOEM	Total Program	AySA / Public Financing	IADB	World Bank
Sub Program 1: Improvements and Expansion of Services / RA1	\$ 1,622,596,000	\$ 312,005,000	\$ 98,994,000	\$ 49,342,000	\$ 163,669,000
Sub Program 2: Improvements and Maintenance /RA2	\$ 552,983,000	\$ 123,441,000	\$ 21,438,000	\$ -	\$ 102,003,000
Sub Program 3: Operations / RA3	\$ 157,522,000	\$ 35,409,000	\$ 1,831,000	\$ -	\$ 33,578,000
PMOEM operational expenditures	\$ 2,532,623,000	\$ -	\$ -	\$ -	\$ -
<b>Other Expenditures</b>					
Operation and Maintenance Costs for Plants		\$ 100,000,000	\$ 100,000,000	\$ -	\$ -
Evaluation and Verification costs		\$ 5,000,000	\$ 5,000,000	\$ -	\$ -
Front-end fees IBRD		\$ 750,000	\$ -	\$ -	\$ 750,000
<b>Total</b>	<b>\$ 4,865,724,000</b>	<b>\$ 576,605,000</b>	<b>\$ 227,263,000</b>	<b>\$ 49,342,000</b>	<b>\$ 300,000,000</b>

18. The estimated cost of the Program over the five-year period is US\$ 576.6 million, to be financed with AySA's own funds (US\$ 227.3 million), other multilateral (IDB) financing of US\$ 49.3 million and IBRD support of US\$ 300 million, to be disbursed upon achievement of a set of Disbursement-Linked Indicators (DLIs). The Program will support interventions in vulnerable areas of Buenos Aires belonging to peri-urban municipalities within AySA's jurisdiction, with low levels of WSS coverage, and whose inhabitants are defined as living below the poverty line.<sup>20</sup> Within these vulnerable areas, there are also socially *fragile neighborhoods*<sup>21</sup> where most of the people live below the extreme poverty line.<sup>22</sup>

19. The Program Development Objectives are to increase access to safely managed<sup>23</sup> water and sanitation services with a focus on vulnerable areas of Buenos Aires<sup>24</sup>, and to improve AySA's efficiency and capacity to respond to water and sanitation emergency needs.

20. The Program has three key RAs: (1) Expansion of WSS services with a focus on vulnerable areas; (2) Improve AySA's efficiency; and (3) Increase AySA's capacity to respond to WSS emergency needs. Each RA includes the following:

- *RA 1 – Expansion of WSS services with focus on vulnerable areas* encompasses:
  - A. Last mile components to connect vulnerable households in *fragile neighborhoods* of peri-urban Buenos Aires where there are already secondary water and sewerage networks in place; and
  - B. Primary WSS infrastructure to expand safely managed water and sewerage services to other vulnerable areas of peri-urban Buenos Aires.
- *RA 2 – Improve AySA's efficiency* encompasses the design and implementation of an Efficiency Improvement Action Plan (EIAP), which analyzes gaps and weaknesses in the existing systems and proposes key performance indicators (KPIs) in specific areas to fill those gaps. In particular, the EIAP will be implemented through two KPIs: (i) Improve AySA's operational efficiency by reducing water losses and energy consumption in production and distribution processes; and (ii) Improve AySA's commercial management efficiency by increasing the percentage of digital payment.
- *RA 3 – Increase AySA's capacity to respond to WSS emergency needs*, particularly its PPE and its strategy to streamline internal and managerial processes to become more agile in responding to

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<sup>20</sup> The poverty line is defined using national standards (INDEC). It considers minimum food consumption plus other basic consumption. [https://www.indec.gob.ar/ftp/cuadros/sociedad/EPH\\_metodologia\\_22\\_pobreza.pdf](https://www.indec.gob.ar/ftp/cuadros/sociedad/EPH_metodologia_22_pobreza.pdf).

<sup>21</sup> *Fragile neighborhoods* are identified as Areas of Low Consolidation (*Áreas de Baja Consolidación, ABC*), Emergent Urbanizations (*Urbanizaciones Emergentes, UREM*) and those on the National Registry for Low-Income Neighborhoods (*Registro Nacional de Barrios Populares, RENABAP*), which are included in AySA's UREM database.

<sup>22</sup> The concept of extreme poverty is defined using national standards. It is equivalent to the "Indigence Line" which seeks to establish whether households have sufficient income to cover a food basket capable of satisfying a minimum threshold of energy and protein needs, called the Basic Food Basket (*Canasta Básica Alimentaria, CBA*). In this way, households that do not exceed that threshold or line are considered indigent.

<sup>23</sup> In this context, *safely managed drinking water* is defined as the use of an improved drinking water source which is located on premises, available when needed, and free of fecal and chemical contamination. *Safely managed sanitation* is defined as the use of an improved sanitation facility which is not shared with other HH and where excreta are safely disposed of in situ or transported to a treatment plant.

<sup>24</sup> It refers to AySA's service area of 26 municipalities plus the Autonomous City of Buenos Aires.

shocks (epidemiological, climate related or financial). As such, Results Area 3 will include the following:

- A. Recognition of AySA's efforts and initiatives to confront the COVID-19 outbreak by ensuring continuity and efficiency in service provision and the use of wastewater-based epidemiology (WBE) to support tracking the spread of the virus in the population;
- B. Strengthening the PPE by capturing the lessons of the ongoing crisis and developing a contingency plan to deal with epidemiological risks and sharing experiences;
- C. Modernization of AySA's processes through digitalization and the incorporation of innovative technologies to anticipate, mitigate, prepare for and recover from the effects of a hazard in a timely and efficient manner;
- D. Strengthening AySA's capacity to engage citizens by implementing an integrated digital strategy to facilitate more fluid two-way citizen engagement via the incorporation of a mobile app and a customer relationship management system (CRM) and the improvement of the response times for the question-complaint-claim and suggestion system (PQRS); and
- E. Promoting gender diversity within AySA's workforce by ensuring quality career advancement opportunities for women.

21. The Program will directly benefit an estimated 445,000 people with access to safely managed water and sanitation services (Results Area 1), 98 percent of whom are considered vulnerable (living below the poverty line) and 165,000 living in fragile neighborhoods. Indirectly, 312,000 people will also benefit from the reduction in water losses. The entire population actually served by AySA (10.7 million people) is expected to indirectly benefit from more efficient, sustainable, and resilient services derived from the results achieved under Results Areas 2 and 3. The Program is also expected to generate around 6,000 jobs (direct and indirect).

### *1.6 Program Boundaries*

22. For the Program's RA 1, aligned with AySA's Sub-program 1 on service expansion, the areas for intervention were selected using a geographical approach which considers the 16<sup>25</sup> municipalities where AySA extended infrastructure from 2015 to 2019, as detailed in Figure 1. Also, under RA 1, the expansion of WSS infrastructure will benefit 8 municipalities.<sup>26</sup> In total, activities in RA1 will occur in 18 municipalities<sup>27</sup>. For RA 2, the Program will support activities to improve networks and operations linked to the provision of drinking water and energy efficiency improvements in AySA's concession area,<sup>28</sup> in accordance with Sub-programs 2 and 3 of AySA's improvement plan and operational plan. The Program will not finance the construction of large infrastructure (contracts larger than US\$ 75 million) nor works in areas of conservation value and the works do not have significant adverse impacts that are sensitive,

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<sup>25</sup> Municipalities where AySA has extended water and sanitation networks between 2015 and 2019 are: Almirante Brown, Avellaneda, Esteban Echeverría, Ezeiza, Hurlingham, Ituzaingó, La Matanza, Lanús, Lomas de Zamora, Morón, Quilmes, San Fernando, San Isidro, San Martín, Tigre and Tres de Febrero.

<sup>26</sup> The expansion of the wastewater treatment plants of Planta Norte and Jagüel will impact the municipalities of Escobar, Esteban Echeverría, Ezeiza, San Fernando, San Isidro, San Martín, and Tigre. The amelioration of the drinking water supply quality will impact Florencio Varela.

<sup>27</sup> Total RA 1 municipalities are: Almirante Brown, Avellaneda, Escobar, Esteban Echeverría, Ezeiza, Florencio Varela, Hurlingham, Ituzaingó, La Matanza, Lanús, Lomas de Zamora, Morón, Quilmes, San Fernando, San Isidro, San Martín, Tigre and Tres de Febrero.

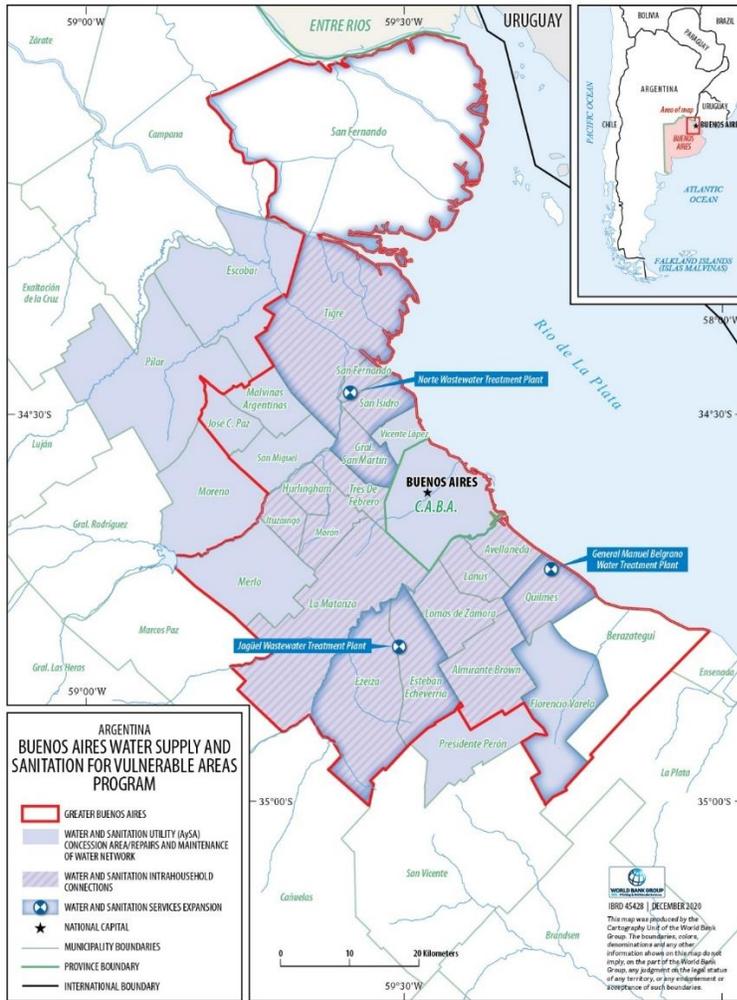
<sup>28</sup> Recurring costs that the company incurs in order to implement the program are excluded from the Program.

diverse, or unprecedented on the environment and/or affected people, and thus are eligible for PforR financing. The works' typologies eligible for financing is summarized in Table 3.

Table 3: Typology of the works financed by the Program.

RA	Typology of work
RA 1	<ul style="list-style-type: none"> <li>- <u>Water intra-HH connections</u>: Connection to secondary water provision network and laying of pipes to bathroom, kitchen, sink, laundry or reserve tank.</li> <li>- <u>Sewerage intra-HH connections</u>: Connection to secondary sewerage system, the construction of the inspection chamber, the laying of pipes, and sealing the septic tank (where relevant).</li> <li>- <u>Improvement of the primary water supply infrastructure</u> including civil and electromechanical works for pumping station, impulsion line, and distribution networks.</li> <li>- <u>Improvement of the sewerage service</u> including pumping station, primary/collector network, secondary network, impulsion line, construction of a new treatment WWTP module, retrofitting WWTP modules, and modernization of WWTP module.</li> </ul>
RA 2	<ul style="list-style-type: none"> <li>- The <u>water loss reduction program</u> includes primary network renewal, secondary network renewal, mesh closure, auxiliary channel renewal.</li> <li>- The <u>reduction of energy consumption program</u> covers pump adjustments, reduction of rounds, precise flow and pressure measurements, Installation of monitoring equipment, fuel savings and vehicle maintenance, energy shifting or temporary shift of energy consumption, replacement of generator sets, renovation of engines, renovation of medium low voltage boards, distributed self-generation</li> </ul>
RA 3	No major infrastructure investments are included in this RA

Figure 1. Geographic definition of the Program boundary



### 1.7 Strategic Relevance

23. The proposed operation is fully aligned with Focus Area 2 of the Argentina Country Partnership Framework (CPF) for Fiscal Years 19-22 developed in 2019. Focus Area 2 of the CPF focuses on addressing key institutional constraints for better governance and service delivery. In particular, objectives 4 and 5 call for increasing transparency and improving service delivery, respectively, which are at the core of the proposed Program. In addition, the proposed Program is in line with the Systematic Country Diagnostic (SCD)’s endorsement of closing basic infrastructure gaps to reduce inequality.

24. The Program was designed to increase AySA’s operational and financial sustainability, thereby contributing to decreasing its dependence on federal budget transfers, and the Program’s three RAs contribute to AySA’s financial independence from the central government. In particular:

- RA 1 increases AySA’s revenue stream through the installation of new intra-HH connections.
- RA 2 increases AySA’s operational efficiency through O&M savings. For this RA, the focus on renovation represents a paradigm shift compared to the historical trend of investing in the

construction of new infrastructure. For instance, from 2006 to 2018, AySA invested more than US\$ 1 billion of which 80% were primarily directed to new infrastructure.<sup>29</sup>

- RA 3 increases AySA's overall efficiency to respond to crises and thus implement strategies aimed at better using resources.

25. The PforR was selected as the most adequate financing instrument to pursue the expected results given the current context. The Program is being requested at a moment when the country faces dual challenges: a weak macroeconomic situation and the public health threat of COVID-19 in the country's largest hotspot. These challenges demand urgent and effective solutions. The government sees the need to accelerate the implementation of AySA's PMOEM to expand access to WSS services quickly with priority for low-income areas, and to reduce losses and thus O&M costs to reduce AySA's dependency on government subsidies. In this sense, the PforR offers the following advantages:

- i) By designing a strong system of incentives through well-defined DLIs, it will be possible to achieve challenging results such as expanding connectivity through community participation, increasing operational efficiency, streamlining managerial processes and improving the agility of internal procedures while at the same time promoting innovation and improving transparency.
- ii) The PforR can acknowledge AySA's ongoing efforts to mitigate the shocks derived from the COVID-19 crisis, including providing water to unserved areas, promoting online payment methods and enabling teleworking for employees, and to mitigate the effects of the outbreak for the most vulnerable.
- iii) It will be possible to strengthen the government's and AySA's own systems by addressing gaps identified in the technical, social and environmental and fiduciary assessments, to be included in the corresponding Program Action Plan (PAP).
- iv) The instrument will serve as an example to promote innovative approaches in the water sector in the country and in LAC by focusing on results and promoting institutional strengthening in a cost-effective manner.

## 2 Technical Soundness

### 2.1 Implementation Track Record

#### Description

26. The Bank has provided support to the Government of Argentina (GoA) and AySA in the recent past through other projects related to WSS, including the ongoing Matanza-Riachuelo Basin (MRB) Sustainable Development Project (P106580)<sup>30</sup> which includes improvements in sewerage services in the MRB and other parts of the PBA and the CABA. AySA is the main counterpart for the Project's sanitation component, which more specifically finances four major works contracts: (i) the Left Bank Collector, 16.2 km of underground sewerage collectors and 12.6 km of secondary collector; (ii) the Riachuelo WWTP; (iii) the Riachuelo Outfall, a 12 km underground sub-pluvial outfall that will help discharge treated sewerage into La Plata River; and (iv) the Southwest WWTP's sludge treatment plant. When completed, these works will support the collection and treatment of 35 percent of the wastewater in AySA's concession, benefiting 4.3 million people.

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<sup>29</sup> 2018 Reporte de Sostenibilidad (AySA, 2019). The currency exchange set was 1 ARS = 0.015 US dollar.

<sup>30</sup> P105680 consists of two loans, namely IBRD-77060 (US\$ 718 million) and IBRD-90080 (US\$ 245 million).

## **Performance and lessons from past projects**

27. The MRB Sustainable Development Project (P106580) underwent three restructurings from 2015-2019 in order to refine the scope and financing arrangements and extend the project closing date to March 31, 2022. The Project's progress has been rated as Moderately Satisfactory since June 2017, with progress on World Bank-financed works standing at 72 percent completion on average. The main challenges faced in previous projects are associated with (i) the financing gap resulting from increases in works contracts and (ii) GoA budget constraints for the provision of counterpart financing. Furthermore, due to the technical and implementation complexity of works under the sanitation component, time lags between appraisal and construction were noted. As some of the construction methods were being used for the first time in Argentina, multiple design and construction modifications were common, leading to increased costs.

### *2.2 Overall Rationale for the Program*

28. **Following an original request for a traditional investment project, close dialogue and engagement with AySA led to the adoption of a new instrument incorporating efficiency and innovative measures.** The Program now goes beyond the reach of a traditional investment project and aims to achieve challenging results such as expanding connectivity through community participation and increasing efficiency, among others, while aligning with objectives expressed in the PMOEM. In a nutshell, the PforR will provide AySA with the financial means to expand its services, while having them focus on efficiency and agility in responding to shocks, a step towards increased financial sustainability. This will materialize into the actions proposed under this PforR, which will also provide guidance for the next PMOEM (2024-2028).

### *2.3 Technical Soundness – Results Area 1 Expansion of WSS services with focus on vulnerable areas*

29. Under RA 1, AySA will undertake: (A) Construction of Household Connections in Fragile Neighborhoods, in areas where there are already secondary networks in place; and (B) Expansion of WSS Primary Infrastructure, increasing access to safely managed WSS services in other areas of the GBA, including household connections when necessary.

#### **(A) Construction of Household Connections in Fragile Neighborhoods**

##### **Objectives**

30. Installing intra-HH water and sewage connections in fragile neighborhoods will yield public health and environmental benefits by improving the quality and reliability of water supply, decreasing the incidence of water-related diseases, and reducing sewage leakage from septic tanks into the domestic environment and broader watershed. These works are especially timely and impactful given the important role of water, sanitation and hygiene (WASH) services as a first line of defense in limiting the transmission of COVID-19. The objectives are to:

- Increase access to safely managed WSS services for HH that, despite their proximity to secondary networks, have yet to connect;
- Promote local employment by conducting the corresponding works through local cooperatives and financing labor, materials and technical assistance;
- Support and deepen social intervention strategies that promote socio-environmental and technical information that encourage HH to connect to and care for WSS networks.

## Beneficiaries

31. Under the Program, AySA will improve access to safely managed intra-HH drinking water and sewerage connections in 16 municipalities where they have expanded the secondary WSS networks in the last five years (2015-2019). AySA has prioritized 11 municipalities<sup>31</sup> from the eligible 16 based on their strong coordination capacity with the relevant stakeholders, including work cooperatives, which will simplify the Program's administration, especially in the first years of implementation. These municipalities also have proven environmental and social management systems to support the works.

32. Beneficiaries include both unconnected HH and those that have informal or defective HH connections. Informal water connections are more likely to be intermittent and have reduced water quality due to inflow and infiltration, and unsewered HH depend on septic tanks which are known to present various degrees of leakage. Businesses are not eligible under the Program and HH that do not wish to be connected to the network will be also excluded from the Program.

33. Within the eligible municipalities, the Program will target beneficiaries in low-income, fragile neighborhoods identified as areas of low consolidation (*Áreas de Baja Consolidación*, ABC), emergent urbanizations (*Urbanizaciones Emergentes*, UREM) and as areas listed under the National Registry of Vulnerable Neighborhoods (*Registro Nacional de Barrios Populares*, RENABAP). These areas were selected based on their sanitary and socio-economic vulnerability. Fragile neighborhoods are usually located in areas with complex terrain conditions: flood-prone land, high water tables and limited access to basic services and health infrastructure. AySA updates its UREM database every 3 years,<sup>32</sup> and the latest report showed 982 UREMs in AySA's concession area (representing 2.82 million inhabitants)<sup>33</sup>, of which 57 percent and 80 percent did not have access to official water supply<sup>34</sup> and to a formal sewerage connection<sup>35</sup>, respectively. The 11 prioritized municipalities contain 66 percent of the UREM in AySA's concession area, representing 1.74 million inhabitants.

## Method

34. **A+T and C+T programs.** AySA has gained considerable experience in working with municipalities to increase the intra-HH connectivity rate through the A+T and C+T programs,<sup>36</sup> and it will build on the results of this model to deliver 10,000 intra-HH water connections and 20,000 intra-HH sewerage connections to vulnerable populations through a series of technical-social works coordinated between each municipality and the cooperatives that are selected to execute and supervise the works. The activities are expected to be executed over the course of 24 months<sup>37</sup> at a cost of US\$ 3.67M for the water

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<sup>31</sup> The prioritized municipalities are Almirante Brown, Avellaneda, Esteban Echeverría, Ezeiza, Hurlingham, La Matanza, Lomas de Zamora, Morón, San Martín, Tigre and Tres de Febrero.

<sup>32</sup> RENABAP urbanizations are included in AySA's UREM database.

<sup>33</sup> Relevamiento Urbanizaciones Emergentes. Resultados generales 2013-2016 (AySA, 2017). The number of fragile neighborhoods correspond to the AySA's concession area until 2015. More municipalities were incorporated from 2016 to 2019, indicating that numbers are possibly higher in the expanded area.

<sup>34</sup> 29 percent of these HH receive water from a neighboring network where the piping has been done by the local community and is usually informal and precarious. Another 15 percent use individual systems that collect water from wells.

<sup>35</sup> 38 percent of these HH have informal and precarious connections to the network and 33 percent use septic tanks.

<sup>36</sup> To date, 2,321 km of networks and 307,903 HH connections have been installed, benefiting 1,453,585 people.

<sup>37</sup> The expected schedule is 18 months for the water connections and 24 months for the sewerage connections.

connections and US\$ 26.06M for the sewerage connections. In addition, the A+T and C+T programs incorporate the following aspects, which are relevant to the present assessment:

- **Community promotion and social engagement.** The A+T and C+T models not only contribute to the installation of new infrastructure, but also deliver training and community awareness campaigns on the benefits of safely managed WSS services. A Community Promotion Plan (managed by 5 cooperative members with support from AySA) guides the social development actions, and AySA instructs the cooperatives to take into consideration the needs and particularities of girls, adolescents and female heads of household. A detailed stakeholder analysis will also be conducted to identify key actors and to understand their influence and motivations.
- **Training in WSS profession.** In total, AySA will provide 85,200 hours of capacity building, including the initial trainings for the cooperatives and additional modules for the foreman and at least one member of the crew. A key benefit of the Program will be the increased capacity of local cooperatives and the professionalization of the WSS workforce.
- **Gender equality.** Both A+T and C+T models aim to create opportunities for women to join cooperatives and gain access to a formal source of income. By joining the cooperatives, women are trained in areas that are traditionally dominated by men, such as WSS, plumbing and other construction and technical skills. Between June and September 2020, 10 working sessions training 11 cooperatives resulted in the incorporation of 45 women into the cooperatives. AySA's trainings for the cooperatives incorporate a gender perspective, including discussing how to adapt work environments to promote gender balance and avoid potential conflicts.
- **COVID-19 precautions.** With oversight from AySA's Hygiene and Safety Manager, cooperatives will implement AySA's COVID-19 protocols developed based on legal requirements, recommendations from relevant international organizations and agreements with trade unions. AySA has budgeted the provision of two sets of personal protective equipment (PPE) for each cooperative. COVID-19 precautions concerning intra-HH connections are discussed in the Environmental and Social Systems Assessment (ESSA).
- **Work-waste recovery program.** Starting in 2020, cooperatives involved in A+T and C+T programs must collect waste materials and determine options for recycling and repurposing them.

## Assessment

35. The assessment of technical soundness relies on the following six dimensions: (i) beneficiary selection; (ii) infrastructure design quality and robustness; (iii) costs; (iv) socio-technical approach; (v) WSS services, including water quality and sustainability; and (vi) incorporation of lessons learned.

36. *Beneficiary selection.* AySA will select beneficiaries based on their socio-economic vulnerability, moving from the most to the least vulnerable HH within a fragile neighborhood. For these, a socioeconomic baseline of beneficiaries will be developed which will include, among others: (i) identification of actual number of unconnected HH and reasons for lack of connection; (ii) acceptance and agreement to participate in the Program; (iii) identification of housing typology based on the construction quality; and (iv) a socio-economic and demographic characterization of the HH.<sup>38</sup> AySA's proposed evaluation of potential beneficiaries is robust as it addresses structural and sociodemographic aspects. These preliminary activities allow for the identification of the appropriate water or sewerage connection

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<sup>38</sup> The socio-demographic survey will be carried out with a gender perspective that assess among others: head of HH, number of girls and adolescents living in the HH, level of overcrowding, etc.

typology for vulnerable HH, as well as the continuous collection of socio-economic data on current and potential beneficiaries, useful to inform their likelihood of benefiting from the reduced social tariff.

37. *Infrastructure design quality and robustness.* Since the secondary water and sewerage networks are already available in the 16 eligible municipalities, it is appropriate and cost-efficient to take advantage of these works to provide HH with piped water and sewerage connections, rather than connecting them through new decentralized systems. In addition, the proposed rate of installation of 100 water or 36 sewerage connections per cooperative per month is reasonable based on previous pilots of similar works in vulnerable areas. Based on past surveys on connection rates and vulnerable housing typologies, AySA has predefined technical designs for three intra-HH water and six intra-HH sewerage connections. These are:

- a. **Intra-HH water connection typologies:** (1) connection to the secondary water network and laying of pipes to bathroom, kitchen, sink, laundry or reserve tank; (2) connection to the secondary water network and laying of pipes to reserve tank, including its replacement and installation; and (3) connection to the secondary network and laying of pipes to reserve tank, including its replacement and installation, and laying of three provision pipes.
- b. **Intra-HH sewerage connection typologies.** Typologies all include the connection to the secondary sewerage network, and will vary depending on whether they include the construction of the inspection chamber(s) (1 or 2 depending the length of pipes required), the laying of pipes<sup>39</sup> (4, 10, 20, 35 and 45 linear meters) and sealing of the septic tank, if relevant.

38. These nine WSS pre-defined technical connection typologies are considered to be appropriate for the housing typologies found in vulnerable settlements and to ensure that the completed infrastructure will comply with existing regulations.<sup>40</sup> Moreover, it is expected that standardized designs will help bring uniformity and consistent quality of connections in all neighborhoods, even though the works will be performed by different cooperatives.

39. *Costs.* The unit cost per water connection is US\$ 321, a comparable figure with LAC regional benchmarks for connecting HH to the secondary water network in informal and vulnerable areas. For sewerage, while the unit cost of US\$ 1,257 is considered to be on the higher end of the spectrum.<sup>41</sup> The difference is justified by the fact that these connections are executed through local cooperatives from the beneficiaries' communities, which require intensive training, time to reach a similar execution level as trained and skilled technical personnel from AySA or private partners, as well as additional supervision from AySA. Further, the large difference between the unit costs of water and sewerage connections is explained by technical complexity and labor costs (3 to 1, as illustrated by the connection completion rate of 600 water connections by a cooperative of 35 people, compared with 200 sewerage connections over the course of 6 months) as well as materials costs (6 to 1, much higher for sewerage than for water). These

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<sup>39</sup> The laying of pipes contemplates the adaptation of the existing sewer drains linked to the storm drainage system.

<sup>40</sup> APLA's 26<sup>th</sup> resolution "Criteria for the Intervention in Construction of infrastructure and operation of WSS in Popular Neighborhoods / Emerging Urbanizations" (APLA, 2017). This Resolution makes explicit the flexibility of the technical requirements demanded in the construction of water and sanitation systems. These new criteria that AySA adopted in response to the RENABAP requirement were developed to set the conditions for service provision in those areas that present a service deficit and that do not have the traditional urban typology.

<sup>41</sup> Similar programs to connect vulnerable HH to sewerage services in São Paulo, Brazil (*Se Liga Na Rede*) and Guayaquil, Ecuador had average costs per connection of about US\$ 780 and US\$ 500-600, respectively.

tasks include more complex plumbing inside the house, but also bypassing and sealing pre-existing onsite disposal solutions such as septic tanks or pits.

40. The Program will directly work with 30 cooperatives, each comprised of 35 workers (manual labor) and 5 project and construction managers, for a total of 1,200 workers. Of these 30 cooperatives, 6 will install intra-HH water connections and 24 will install intra-HH sewerage connections. The baseline monthly minimum salary<sup>42</sup> for the cooperative workers engaged in manual labor and community promotion will be in line with the Labor Contract Law (ARS 16,875) with an additional 12.5 percent (ARS 18,984) for increased productivity and 25 percent (ARS 21,094) if the cooperative achieves the target rate of installing 100 water or 33 sewerage connections per cooperative per month. This is in line with market rates and will cover the monthly total market basket for an adult (ARS 15,280 as of September 2020) or, if the Program remains on schedule, the monthly basic market basket for a family of four (ARS 19,430 as of September 2020). Salaries will be adjusted for inflation by AySA's Community Development Directorate.

41. *Socio-technical approach.* The A+T and C+T programs use a strong social and gender-inclusive approach, using communications plan to promote hygiene practices and build capacity for new system users, with targeted support for women and girls. While planning the social outreach, the stakeholder analysis is critical to ensure that key community actors are informed about the works and can use their influence to mitigate any social risks. Given that the COVID-19 pandemic may limit the ability to hold community meetings or roundtables, AySA will also use virtual and digital citizen participation tools to engage with the community, as further discussed in the ESSA. Overall, the social interventions and communications campaigns are considered to be well designed and were found to be flexible to respond to specific neighborhood situations and the new conditions and context brought by the pandemic.

42. The A+T and C+T programs also have a long track record of mobilizing local workers and promoting jobs in low-income neighborhoods, a key aspect in the context of the post-COVID-19 economic recovery, and although some of the cooperative members may be inexperienced, AySA's partnership with the Leopoldo Marechal Institute to train the cooperatives in the provision of WSS infrastructure brings a solid technical basis for these programs, also allowing to use the skills developed during the Program to later provide services to other vulnerable communities.

43. *WSS services – Water quality.* While the Program seeks to improve water quality for those with informal connections, certain water quality concerns will need to be addressed, particularly the presence of arsenic and elevated levels of nitrates in some water sources. AySA has not recorded exceedances in terms of its arsenic concentration standard of 50 µg/L<sup>43</sup> in its wells since 2018 as per the current regulatory framework in Argentina. It is worth pointing out, that water distribution systems of La Matanza Oeste (14.5 µg/L) and Almirante Brown - Esteban Echeverría – Ezeiza water distribution systems (21.4 µg/L) exceeded the WHO standard, as did 77 percent of measurements of arsenic in groundwater supplied to the network.<sup>44</sup> For nitrates, AySA's standard of 45 mg/L<sup>45</sup> is more stringent than the WHO standard of 50 mg/L, nevertheless, 52 percent of measurements of nitrates in the groundwater supply to the network

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<sup>42</sup> The minimum salary is designed to ensure a worker has adequate food, decent housing, education, clothing, health care, transportation and recreation, vacations and social security. Value is from October 2020.

<sup>43</sup> Standard included in AySA's regulatory framework

<sup>44</sup> Informe de Niveles de Servicio 2018. AySA, 2018.

<sup>45</sup> Based on the Código Alimentario Argentino.

exceeded AySA's standard in 2018. In both cases the PMOEM foresees progressive improvement measures that consider a replacement or mix of the groundwater source with surface water, in order to comply with regulations in a sustainable manner. The DLI verification protocol will include water quality testing to ensure that all beneficiaries associated to DLI1 comply with the definition of "safely managed access".

44. *WSS services – Sustainability.* The main challenges in terms of long-term sustainability are linked to AySA's ability to manage and finance the O&M costs of the WSS systems (addressed under Results Area 2) and whether HH will maintain their internal formal connections and pay the tariffs, or revert back to informal connections or unimproved water sources. Community education and outreach will ensure that HH are aware of the health, economic and local environmental benefits of safely managed WSS services and thus motivate them to maintain the connections. As for tariffs, AySA mitigates the risk of non-payment by employing two reduced rates: a variable social rate that is based on HH income and ability to pay for other services (ex. electricity, cable, cellphone) and a special free rate for HH in a critical socio-economic situation.<sup>46</sup> The Program's support for new digital payment methods will also facilitate bill collection. It is to be noted that AySA has discontinued similar programs in the past because of budgetary restrictions, however, the Program disbursement schedule agreed upon with AySA should provide adequate budget to complete the corresponding activities (see Part B – Program Expenditure Framework for further detail). In terms of environmental sustainability, the work-waste recovery program will be essential to reduce the environmental impact of the Program and prevent materials coming the replacement of existing connections from going to landfills, favoring a recycling pathway, where possible. Environmental and social sustainability aspects are considered further in the ESSA. **Overall, the Program is considered to include a strong set of activities to promote the environmental, social and financial sustainability of the intra-HH water and sewerage connections.**

45. *Incorporation of lessons learned.* The Program will benefit from several lessons learned from previous work on A+T and C+T in the La Matanza and Avellaneda municipalities. AySA has also gained experience from similar pilot studies to expand access to WSS services with a local river basin authority (ACUMAR) and through the program *Argentina Trabajo*. These include: (i) the initial community surveys are considered to be essential to inform the planning stage and create accurate implementation timelines; (ii) during implementation, the cooperatives are more effective if they can specialize and split the work into three stages: excavations, plumbing, and then closing; and (iii) on social engagement, carefully coordinated communications plans must be designed to provide clear and accurate information and reinforce the messages over time. Large community meetings are simply a starting point, and often, personal attention is required to fully explain the planned works and their benefits. To standardize the messaging, the technical cooperative staff must also be able to clearly articulate the objectives and details of the project. This will help reduce the observed challenge of neighbors misunderstanding the works and spreading accidental misinformation in the community. Establishing and maintaining a trusting relationship with the community is critical for the intra-HH connections programs to succeed.

## **(B) Expansion of WSS Primary Infrastructure**

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<sup>46</sup> This *Modalidad Caso Social* applies to HH with income limited to food expenses, minors or elderly dependents, disability, chronic diseases, single-parent homes or that live in non-residential properties used as living place.

46. Expansion of primary infrastructure concerns water supply to the Florencio Varela municipality, as well as the expansion of the Norte and Jagüel WWTPs.

### **B.1 Florencia Varela (Water Supply)**

#### **Objectives**

47. The objective is to provide safely managed water services to the Florencia Varela municipality, including vulnerable users, by ensuring that piped water complies with quality standards, thereby reducing the risk of water-related diseases. In particular, following its takeover of service provision in Florencio Varela in 2017, AySA seeks to address the long-standing nitrate issue in piped water, which exceeds the regulatory standard of 45 mg/L. AySA currently operates 138 deep wells which draw from the deep Puelche aquifer<sup>47</sup> (contains high nitrate concentrations) and the deeper Hipo-Puelche aquifer (contains low nitrate concentrations), and progressive pollution, mainly from poorly contained human waste, has led to elevated nitrate levels in some of these wells.

#### **Beneficiaries**

48. Given that the sole source of water for Florencio Varela does not comply with drinking water standards, the entire municipality will benefit from improved and adequate quality water with an initial focus on the northern area where nitrate pollution is the heaviest. The number of beneficiaries is estimated at 100,000 people (equivalent to 25,000 HH) of which 14,500 live in fragile neighborhoods. This was estimated by using GIS to overlay AySA's service area with geospatial census data on the number of residents and with geospatial data on fragile neighborhoods.<sup>48</sup>

#### **Method**

49. To bring water quality into compliance, AySA will decommission poor quality wells and bring treated surface water of high quality from the Belgrano water treatment plant (WTP), which recently increased its capacity, to dilute the existing polluted groundwater in Florencia Varela. The water will be conveyed from the Belgrano WTP to Florencia Varela through: (i) the construction of a new 4000 m<sup>3</sup>/h pumping station equipped with two running pumps and two standby units, connected to the WTP through a 1600 m long, 1200 mm diameter reinforcement pipeline; and (ii) a 4550 m long, 700 mm diameter conveyance pipeline to the Cruce cistern to mix the pumped surface water from the Belgrano WTP with groundwater, before its distribution through the network to the northern area of the municipality.

#### **Assessment**

50. The proposed mixing of surface water from the Belgrano WTP with groundwater from the Puelche and Hipo-Puelche aquifers is a technically reasonable approach to address the issue of compliance with the Argentinian nitrates concentration standard of 45 mg/L. Table 4 shows the reduction in nitrates concentration resulting from the proposed dilution, which is calculated for the whole population of Florencia Varela and using a demand of 400 liters/person/day. Although the average demand in the GBA may be higher, the initial number of beneficiaries is approximately only 40 percent of the total population of the municipality, and it is thus reasonable to assume that one pump working at a 2,000 m<sup>3</sup>/h flow is

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<sup>47</sup> It is a semi-confined aquifer located, on average, more than 40 meters deep with a variable thickness of 20 to 90 meters, characterized by a very high quality of water naturally.

<sup>48</sup> Note that during the expansion of WSS service, AySA is responsible for primary infrastructure and the network until the secondary lines. The HH connection is the responsibility of the homeowner, yet AySA can facilitate the connection in vulnerable areas as explained under RA 1.1.

sufficient to supply water to the northern area, as well as to fully comply with applicable standards. In the future, adding an additional pump will provide sufficient water for the municipality’s total population of 240,000 people, which AySA would be able to connect once the necessary funding for additional conveyance pipelines and mixing canisters becomes available. If demand is higher than projected, AySA could activate an additional pump (if initially operating with a “1 running pump + 1 standby pump” mode they could switch to a “2 + 1” mode; alternatively, if already using a “2 + 2” mode they could switch to a “3 + 1” mode). They could also increase efforts to reduce physical losses in the area, thus reducing demand. In addition, AySA plans in the long-term to increase coverage in sewerage sanitation in Florencia Varela, allowing for the decommissioning of leaky septic tanks and the progressive reduction of groundwater pollution to in turn reduce the need for surface water dilution to meet the drinking water quality standards.

51. The investment costs associated with this activity are estimated to amount to US\$ 40 million, which meets the needs of almost 100,000 people, and the civil works at the pumping station and initial trunk main for an additional 140,000 people are reasonable based on similar projects. AySA selected the most suitable water source to minimize the costs of complying with water quality standards, as the Belgrano WTP is the closest to the target area, reducing the solution’s capital and operational costs.

Table 4: Projected reduction in nitrates concentration in Florencia Varela

<b>Demand and nitrates concentrations</b>	<b>2029</b>	<b>2039</b>	<b>2049</b>
Water demand in Florencia Varela [m <sup>3</sup> /h]	8,368	9,237	9,341
Available supply Puelche aquifer [m <sup>3</sup> /h]	5,580	4,998	4,602
Available supply surface water [m <sup>3</sup> /h]	2,100	3,600	4,100
Available supply Hipo-Puelche aquifer [m <sup>3</sup> /h]	920	920	920
Nitrates concentration deep wells Puelche [mg/L]	58.6	72.0	88.8
Nitrates concentration surface water [mg/L]	0	0	0
Nitrates concentration deep wells Hipo-Puelche [mg/L]	2.0	2.0	2.0
Nitrates concentration of the mixed water [mg/L]	39.2	39.1	43.9

## **B.2 Expansion of WWTPs (*Wastewater*)**

### **Objectives**

52. This activity seeks to increase access to safely managed sanitation services by ensuring that sewage collected through existing or newly built networks in the Escobar, Esteban Echeverría, Ezeiza, San Fernando, San Isidro, San Martín, and Tigre municipalities is treated according to standards, in turn contributing to decreasing the incidence of water-related diseases and reducing pollution of water bodies and the environment. This will be done through infrastructure investments in wastewater treatment modules in the existing WWTPs of Norte and Jagüel, the extension of sewerage networks, including wastewater pumping stations, and HH connections to be implemented through regular construction contracts. AySA has a policy of not connecting HH to sewerage networks until these feed into a functioning WWTP, and the correct operation of WWTPs is thus key to enabling the expansion of sewerage services.

Table 5: Projection of population connected to new modules at the Norte and Jagüel WWTPs.

	Current population in the target area <sup>49</sup>	Projected connected population to each WWTP through new networks				
		Year 1	Year 2	Year 3	Year 4	Year 5
<b>Norte WWTP</b>						
Non-fragile	246 109	5 662	33 997	73 681	106 797	148 488
Fragile	97 745	-	-	4 680	14 440	19 800
Subtotal Norte	343 854	5 662	33 997	78 361	121 237	168 288
<b>Jagüel WWTP</b>						
Non-fragile	65 093	-	-	11 444	34 331	47 349
Fragile	34 063	-	-		5 040	9 840
Subtotal Jagüel	99 156	-	-	11 444	39 371	57 189
<b>Totals</b>						
Non-fragile	311 202	5 662	33 997	85 124	141 127	195 837
Fragile	131 808	-	-	4 680	19 480	29 640
Total	443 010	5 662	33 997	89 804	160 607	225 477

### Beneficiaries

53. Although AySA plans on providing treatment services to up to 500,000 people by 2030 through these Norte and Jagüel WWTPs, it is estimated that 168,000 and 57,000 will benefit from the respective expansion of these WWTPs by the end of the Program, as presented in Table 5.<sup>50</sup>

54. To estimate the number of beneficiaries from the WWTPs' additional treatment capacity, AySA overlaid drawings of the catchment areas served by the networks that will discharge to these two plants with georeferenced census data. To identify households in fragile areas, AySA assessed the suitability of serving each of the identified fragile neighborhoods and selected those with better technical conditions, after which information from the RENABAP/UREM census was used to determine the number of fragile beneficiary households.

### Method

55. Table 6 presented the two WWTPs in the target area, including a description of the current situation and planned investments.

Table 6: Description of Norte and Jagüel WWTPs – current and planned.

WWTP	Description of current status	Description of planned investments
Norte	Receives wastewater from the networks of the Tigre, San Fernando and part of San Isidro municipalities and has two existing parallel modules, each with a treatment capacity of 0.9	AySA proposes to build a new module (Module 3), similar to the existing ones, but which will be upgraded to incorporate biological nutrient removal or BNR (nitrification/denitrification, such as in the case of the Modified Ludzack-Ettinger process), which will allow AySA to

<sup>49</sup> This is the population that currently inhabits the areas that will be served with the new networks to feed into the new modules of the Norte and Jagüel WWTPs.

<sup>50</sup> The DLI matrix will disburse against this number of beneficiaries.

	<p>m<sup>3</sup>/s (300,000 people equivalent each module).</p> <p>Both are under operation and consist of pre-treatment, biological treatment by the activated sludge process - extended aeration (Module 1) and trickling filters (Module 2), clarifiers, as well as sludge concentration and drying facilities.</p>	<p>comply with more stringent discharge standards that will be imposed in the near future.</p> <p>The new module will have a capacity of 1.0 m<sup>3</sup>/s (capacity for 300,000 people) and will include, among other process units: (i) an additional 3,240 m<sup>3</sup>/h pump set installed in the existing pumping station; (ii) an additional screen with an automatic cleaning system to be installed in an existing structure; (iii) additional sand and grease traps and the corresponding treatment; (iv) a new distribution well to the primary clarifiers; (v) two new 45 m diameter primary clarifiers; (vi) three new aeration tanks with four new blowers in a new building; (vii) a new distribution well to the secondary clarifiers; (viii) four new 45 m diameter clarifiers; (ix) a new Parshall flume; and (x) a new pumping station for the wastewater treated in all three modules to discharge to the existing outfall.</p> <p>AySA is also optimizing the existing modules 1 and 2 at Planta Norte to increase the capacity in 0.36m<sup>3</sup>/s (capacity for 100,000 people) from 1.8 m<sup>3</sup>/s to 2.16 m<sup>3</sup>/s. The measures for this optimization split into 3 groups: (i) electromechanical installations (aeration tanks and final sedimentation tanks); (ii) civil works (surfacing, general works, excavations and refilling, pavement, sidewalks, reinforced concrete works, distribution chambers, foundations, buildings, electric closet, fire installations); and (iii) electrical installations.</p>
Jagüel	<p>Located in the Esteban Echeverría municipality within the Matanza Riachuelo Basin, this WWTP has two parallel modules, consisting of pre-treatment, biological treatment by the activated sludge process - extended aeration (Module 1 with the capacity to serve 30,000 people) and trickling filters (Module 2 with the capacity to serve 150,000 people), clarifiers, as well as sludge concentration and drying facilities.</p> <p>Module 1 is currently out of operation, and Module 2 is operating at full capacity (0.46m<sup>3</sup>/s), and unable to handle current and future demands, especially considering network extensions already under construction. The plant needs to be expanded to accommodate the vegetative growth of the service area and bring the networks of San Martín and parts of Tigre and Escobar into service.</p>	<p>AySA will increase treatment capacity by retrofitting part of the infrastructure of the decommissioned Module 1 and building additional elements to implement the same treatment process as for Module 3 of the Norte WWTP. The new facilities will include, among other elements: (i) additional inlet pumping capacity to cater for the additional flow; (ii) new electromechanical equipment for an existing sand trap currently not used; (iii) two new 34 m diameter primary clarifiers; (iv) an activated sludge tank with a previous anoxic zone for nitrification/denitrification (to be built by transforming the existing extended aeration trench and installing a fine bubble aeration system); (v) two secondary clarifiers (one existing to be reconditioned and one new 34 m diameter clarifier); sludge management facilities recovering the existing sludge silo and building a new sludge distribution chamber, pumping station and pipework; (vi) Parshall flumes; (vii) a new treated wastewater channel to the pumping chamber; and (viii) additional pumping capacity for treated wastewater towards the existing outfall. The final capacity of the plant will be 0.82m<sup>3</sup>/s, corresponding to 250,000 people.</p>

56. AySA will use existing and planned networks and trunk-mains as well as similar infrastructure under construction to convey wastewater to the Norte and Jagüel WWTPs, in order to treat all wastewater collected from new connections and ensure that current treatment remains effective and in compliance with applicable standards. To that end, AySA will increase the treatment capacity of the Norte and Jagüel WWTPs to service an additional 400,000 and 100,000 people respectively. These interventions will also allow for the sealing of defective or poorly managed septic tanks.

57. Sewerage network expansion is implemented with traditionally used materials such as PVC (nominal stiffness 32), and installation will use pipejacking, commonly used for underground pipelines and ducts. Totals of 410 km and 83 km (including 5 km for the main collector) of pipes will be installed in the Norte and Jagüel areas of influence, respectively.

### **Assessment**

58. The need for expanding the WWTPs is justified by the planned expansion of the sewer collection network, some of which is already ongoing. In addition, the proposed treatment processes are adequate to ensure compliance with current standards as well as with the more stringent discharge standards soon to be enforced. For the proposed wastewater treatment investments, the technical assessment focused on the review of the following documents made available: (i) preliminary studies for the Jagüel WWTP (*anteproyecto*) and (ii) the technical specifications and design criteria for the Norte WWTP (extracts from bidding documents). From this review, it can be observed that AySA's technical design/engineering department has the capacity to prepare robust documents and the bidding documents presenting detailed specifications of works and installations were found to be sound. The choice of technologies used is considered adequate for the treatment requirements and capacity of AySA's operators, and if properly designed and constructed, the WWTPs should be operated in a satisfactory manner. In addition, the construction timeline of close to two years (excluding procurement) is reasonable and in line with what is generally accepted for this type of technology. The review also highlighted cost optimization opportunities which could have been derived from a more rigorous comparison of alternatives during the design stage. In particular, the assessment focuses on: (i) technical aspects such as BNR, cogeneration, resilience and sewerage networks; (ii) procurement; and (iii) costs.

59. *Technical aspects – BNR.* Effluent quality requirements used by AySA for the design of the new WWTP facilities are found under "Resolution 46/2017 ACUMAR" which defines, amongst others, effluent discharge limits into recipient waters, and for water quality itself in those bodies of waters. It is of the World Bank Team's understanding that the latter set of standards was used by AySA to derive the strict treatment targets for the WWTP expansions, i.e. a concentration of  $BOD_5 \leq 15$  mg/L and a nitrate concentration of  $\leq 10$  mg  $NO_3-N/L$  (compared with the actual discharge limits of  $BOD_5 \leq 30$  mg/L, and no nitrate requirement). Discussions with AySA staff point to various elements which can help understand the selection of these criteria, for instance: (i) the dilution effect in the receiving water bodies is not of significance, as low river flow scenarios present figures of the same order of magnitude as the discharges from the WWTPs (mixing ratio of 1:1); (ii) low nitrate concentrations in the WWTP effluent improve the efficiency of the plant's final sedimentation tanks, and thus minimize the loss of small suspended particles through the effluent, which have the potential to deteriorate effluent parameters in general. Consequently, employing discharge limits of  $BOD_5 \leq 15$  mg/L and  $\leq 10$  mg  $NO_3-N/L$  for WWTP design is here considered to be reasonable. Nevertheless, opportunities may arise to optimize the technological

solutions and their associated costs (see recommendations section in Part E), considering that upgrading to BNR standards could increase CAPEX and OPEX by about 20 to 30 percent.

60. *Technical aspects – Cogeneration.* The unit cost of electricity of US\$ 6.5 cents/kWh at the WWTPs is considered low, rendering unattractive from a financial point of view the use of biogas for cogeneration, and beyond heat generation which is being considered by AySA. Even though AySA confirmed that the reduction of greenhouse-gases is an important factor in taking investment decisions, cogeneration will remain unattractive unless electricity prices increase in Argentina.

61. *Technical aspects – Resilience.* The documents revised by the World Bank did not include an infrastructure resilience analysis, describing for example possible damage that may arise from flooding, drought and wind, the identification of hazards, and a discussion of possible failures, risks and mitigation measures. However, AySA confirmed that the sites on which the WWTPs are currently built and operating, and where the expansions will take place are well suited and resilient. In particular, the infrastructure is built with an average elevation of 0.5 m on top of the 100-year flood water levels. Note that the disaster risk analysis identified floods as the main hazard to consider in the Program area.

62. *Procurement.* Works are generally procured using construction contracts in which the Contractor is responsible for carrying out the works using engineering designs prepared by AySA, as well as WWTP commissioning and operation throughout the startup process, while providing AySA with training on all operational aspects of the facilities and a one-year guarantee period. These requirements are considered reasonable to ensure a smooth transition and future operation of the treatment plants. Although the engineering designs developed by AySA are considered to be adequate to go to bid, it is to be noted that procuring works with basic engineering designs could require adjustments and contracts amendments over the course of implementation.

63. *Costs.* The Norte WWTP construction of module 3 CAPEX figures amount to US\$ 72 million (VAT included), translating into a per capita investment cost of US\$ 240, it is here considered to be within benchmark levels. As for Jagüel, with an investment figure of US\$ 11 million to serve 100,000 people, a per capita investment cost of US\$ 110 is here considered to be reasonable, even if the WWTP will be relying on existing works and installations, driving the CAPEX down. In terms of O&M, the Norte (US\$ 9 per capita per year) and Jagüel (US\$ 13 per capita per year) WWTPs present OPEX figures in line with data observed in similar constructions in other countries (US\$ 10 per capita). OPEX figures for the Norte WWTP may be slightly lower due to economies of scale.

#### 2.4 Technical Soundness – Results Area 2 Efficiency

64. This RA aims to improve AySA's efficiency by supporting the preparation and implementation of an Efficiency Improvement Action Plan (EIAP) with 5-year and 20-year planning horizons, which will incorporate initiatives and actions included in the PMOEM and account for the financial impact of such activities, as measured by the working ratio with self-generated funds and specific unit costs of operations.

65. While the EIAP will cover all operational and support areas of the service provider, this RA will further emphasize the implementation of actions in two pivotal dimensions:

1. **Operational efficiency:** Reduce physical losses and energy consumption in the water supply network, which will also reduce greenhouse gas (GHG) emissions since the electricity matrix in Argentina is about two-thirds based on fossil fuels; and
2. **Commercial efficiency:** Support AySA's digitalization of payment methods to reduce cost and free up resources.

66. To contribute to these two dimensions, the EIAP will summarize the planned actions to improve operational and commercial performance as well as contribute to financial sustainability. The EIAP will contain at least four lines of action, namely: (i) NRW reduction; (ii) energy efficiency improvements; (iii) commercial efficiency (billing and collection); and (iv) productivity improvements. As the main actions for the first three lines of action have already been identified by AySA, the assessment for RA 2 is organized around the three following sections: A) NRW reduction; B) energy efficiency improvements; and C) digital payment methods.

### A) NRW reduction

#### Objectives

67. AySA's objective is to reduce physical losses by at least 123,374 m<sup>3</sup>/day (or 125,374 m<sup>3</sup>/day if minor savings from improved pressure management were to be considered). This will reduce the overall NRW, electricity consumption and the associated costs, reduce the natural rate of loss growth and reduce network maintenance costs. In turn, by reducing physical losses in its system, AySA will be able to increase resilience and water availability, improve service quality and extend coverage, thus delaying investments to increase production capacity.

#### Beneficiaries

68. NRW reduction beneficiaries include AySA itself through the potential financial gains from the reduced water production, including the delay of costly capacity expansion, as well as through increased knowledge of its distribution system. Customers in the areas where pipe and service connection replacement (approx. 53,000) will take place could also benefit from more stabilized water pressure throughout the system, and considering the current per capita consumption of 400 liters per capita per day, the water planned to be recovered equates to about additional 312,000 people that could be served.

#### Method

69. Since 2007, AySA has conducted several studies to develop its strategy to reduce real losses, using the International Water Association (IWA) methodology, and has implemented several measures derived from those studies. According to AySA's 2018 water balance (shown in Table 7), physical losses stand at 36.7 percent (690,767,610 m<sup>3</sup> compared with a 1,884,127,810 m<sup>3</sup> production).

Table 7: AySA water balance.

	Volume (m <sup>3</sup> /year)	% of the volume delivered
Water volume delivered to the network	1,884,127,810	
Authorized consumption	1,121,193,495	59.5%
Billed consumption	1,109,169,300	58.9%
Metered consumption	272,235,250	14.4%
Estimated consumption (not metered)	836,934,050	44.4%

Unbilled consumption	12,024,195	0.6%
Metered consumption		
Estimated consumption (not metered)	12,024,195	0.6%
Water losses	762,934,315	40.5%
Apparent losses	72,166,705	3.8%
Real losses	690,767,610	36.7%

70. AySA plans to achieve its NRW reduction objective through four types of actions, with two providing close to 95 percent of the total water savings, as shown in Table 8.

Table 8: Actions proposed by AySA and expected results

Action	Quantity	Unit	Water recovered (m <sup>3</sup> /day)
Network replacement	510	km	59,174
Network rehabilitation	30	km	2,000
Network sectorization (DMAs)	10	DMAs	1,200
Pressure management	15	Number	2,000
Active leakage detection and repair	25,000	km	51,000
Saavedra lifting station rehabilitation	N/A	N/A	10,000
Total			125,374

71. These include:

- (i) Network replacement and rehabilitation. AySA will replacing 510 km of mains, including approximately 53,000 service connections using trenchless pipe bursting technology and high-density polyethylene (HDPE) pipes, and rehabilitate 30 km of pipelines through internal mechanical cleaning and polyurethane resin coating in areas where renovation poses serious challenges. Areas of intervention were selected according to criteria such as the frequency of pipe bursts, the type of material and age, capturing those with higher losses than the average;
- (ii) Network sectorization and pressure management. AySA will implement District Metered Areas (DMA) including flow and pressure management and install meters, variable speed drives (VSDs) in pumping stations to optimize energy consumption and water losses, as well as intelligent devices for pressure reducing valve (PRV) management to improve efficiency, saving water while reducing stress on the network;
- (iii) Active leakage detection and repair. AySA will generate high impacts with the detection of leaks using satellite-sensing technology, which would cover the whole system operated by AySA (25,000 km). This method detects variations in soil conductivity depending on whether it is dry or wet, identifying areas where leaks may exist. With this information at hand, traditional noise correlation techniques can be used (and teams can be dispatched) more effectively; and
- (iv) The rehabilitation of the Saavedra lifting station. AySA will install VSDs to reduce pressure peaks in the networks, further reducing losses.

**Assessment**

72. AySA’s proposal to reduce real losses is considered to be adequate, as it was built following sound criteria to identify the magnitude of the key components of water losses, as well as techniques that have proved successful and cost effective, such as trenchless pipe bursting and satellite sensing leak detection.

73. AySA will be replacing and rehabilitating yearly about 1 percent of the total network or 1.5 percent of the 4,500 km long network older than 100 years old or made of breakage-prone asbestos cement pipes, and aims to increase the replacement rate to about 2 percent of the total network per year. The new pipes will be made of HDPE, which provides confidence in the durability of the new networks. Replacement of service pipes is a sound practice as 85 percent of leaks originate from these, even though they constitute only 34 percent of the total network length. AySA identified tapping points on PVC pipes to be the most prone to leak, which is comparable with findings in other systems in the developing world. Although small in number, the implementation of 10 DMAs (including intelligent PRVs and consumption meters) is a continuation of previous efforts and a move towards gaining control of the system to ultimately improve operation, maintenance, billing, engineering and water quality controls. In addition, satellite leak detection will help AySA overcome the deficiencies of traditional noise correlation methods in low pressure systems, as these methods depend on higher levels of service pressures than those in AySA's networks. This technique will allow AySA to quickly identify probable leaks and empower the correlation crews to proceed and confirm their exact location with traditional methods. AySA conducted a pilot test with this technology, and results were promising.

*Table 9: Water recovery targets derived from previous experience*

Year	Works progress (m)	Volume recovered per km (m <sup>3</sup> /km/day)	Water recovered (m <sup>3</sup> /day)	Admissible loss of renewed pipes (m <sup>3</sup> /day)	Theoretical volume recovered (m <sup>3</sup> /day)
1	84,896	143.7	12,198	1,698	10,500
2	181,954	136.0	24,753	3,639	21,114
3	243,450	133.2	32,429	4,869	560
<b>Total</b>	<b>510,300</b>		<b>69,380</b>	<b>10,206</b>	<b>59,174</b>

74. To determine the water recovery targets through pipe replacement, AySA used data on losses per kilometer obtained from previous experience with infrastructure renovation, similar to the proposal made for this Program. See Table 9.

75. Considering that the proposed rates of water recovery may not be fully representative of the conditions prevailing in the areas to be intervened under the Program, AySA agreed to perform two pilots in DMAs to validate the recovery parameters. If water savings are lower than those calculated based on AySA's previous experience, targets will be revised using the average rate resulting from these pilots, posing the risk that results may be lower than foreseen. However, this risk is considered to be low, as the targets seem conservative given that the admissible water loss from renewed pipes assumed by AySA at 20 m<sup>3</sup>/km/day is rather high for HDPE pipes, given AySA's working pressures.

76. An added benefit of the proposed interventions is the reduction in the natural leakage growth rate, an impact which may nevertheless be difficult to measure due to the lack of a baseline at the time of Program preparation. If AySA proposes a methodology acceptable to the Bank to measure the growth rate of leakage in intervened and non-intervened areas, the differential will be considered to calculate the results. In addition, targets for satellite leak detection and repair were established by calculating the statistical occurrence of different kinds of breakages and associating each of them with typical loss rates, using the Burst and Background Estimates (BABE) model, considered to be an adequate methodology.

77. AySA plans to retain the services of several contractors to implement the work, and investment costs, as compared to the expected results, are in line with similar regional experience.

## B) Energy Efficiency Improvements

### Objectives

78. AySA's objective is to reduce energy consumption by at least 33,930 MWh/year (33.93GW/year) and improve reliability of service.

### Beneficiaries

79. The proposed actions will benefit an estimated two million people, although the interconnection of AySA's water networks makes it difficult to determine a precise figure.

### Method

80. AySA is seeking to reduce energy consumption to improve its environmental and financial sustainability, reducing energy and maintenance costs. The proposed actions and expected results are presented in Table 10. AySA will also carry out other actions to improve reliability, reduce maintenance costs and comply with regulations for high consumption energy customers. These actions include the modernization of monitoring equipment at large consumption centers, the installation of a high-capacity power storage unit to prevent disruption of critical processes due to power supply interruptions, and refurbishment of control panels in two pumping stations in addition to those indicated in Table 10. AySA also plans to Table 10install energy monitoring equipment to better understand the actual energy needs of distributed water production and sewage pumping facilities, allowing AySA to renegotiate the contracted power with the power company, change motors for pumps to work at the optimal functioning point and save on other operating costs related to deep well visits, reduce billing mistakes by the power company and avoid power factor surcharges, among others.

81. Solar panels to be installed in selected locations at the San Martin and Belgrano WTPs and at the Berazategui WWTP will serve as a pilot test and could be scaled up if economically attractive. Energy storage using battery energy storage systems (BESS) is another pilot that has potential for meaningful cost savings, as the timing of power consumption could be shifted to storing energy during valley hours and using it on peak hours and reducing the usage of fossil fuel power generator in case of power disruption. In addition, the refurbishment of pumping facilities mentioned in Table 10 entails two activities, i.e. (i) the phasing out of old electric switches in poor condition which constitute a fire hazard for new ones that use spark suppression cells (to be done in four pumping stations); and (ii) replacing motors with more efficient ones equipped with VSDs which allow reducing friction losses and other inefficiencies (to be done in two of the four previously mentioned pumping stations).

Table 10: Summary of the actions and the expected results

Activity	Description	Consumption (MWh/year)	Specific consumption (MWh/m <sup>3</sup> )	Estimated annual savings (MWh/year)
<b>Distributed monitoring of energy consumption plan</b>	800 deep wells - Installation of equipment for energy monitoring (quality and consumption) connected to the Energy Monitoring Center	77,760	0.46122	23,328

	146 STPs - Installation of equipment for energy monitoring (quality and consumption) connected to the Energy Monitoring Center	12,710	N/A	3,813
<b>Distributed self-generation of energy - 200KW</b>	Construction of small-scale solar plants at the San Martin WTP, Belgrano WTP and Berazategui WWTP to reduce energy consumption from the grid showing AySA's commitment to the environment as a sustainable company	N/A	N/A	1,750
<b>Refurbishment of the Saavedra water pumping station</b>	Replacement of medium voltage command panels for spark prevention cells, installation of new motors and variable speed drives for the pumps to balance supply and demand	16,514	0.19585	3,633
<b>Refurbishment of the raw water pumping station at the San Martin WTP</b>	Replacement of motors N° 1 and N° 2 with new permanent magnet 690 volts motors provided with variable speed drives, replacement of valves and vacuum system.	64,848	0.05916	1,406
<b>Total</b>				33,930

**Assessment**

82. Actions relating to distributed energy monitoring in deep wells and sewage pumping stations are the 4th and 5th stages of an ongoing AySA program that has already shown good results. AySA expects even better results during the Program due to the higher power consumption of the targeted facilities, and given the experience gained by AySA during the previous three stages of this ongoing program, it is likely that these higher savings will be achieved. Moreover, pilot projects on monitoring and equipment renovation showed a reduction in the energy use in the order of 40 percent. The average cost per well is estimated at US\$1,700, including the monitoring equipment and installation of new motors in one third of the pumps, in line with costs provided by experts from public utility *Aguas de Portugal* who provided support for this assessment.

83. Solar panel power plants are now quite reliable and AySA’s estimation of 200 kW effective power from a 1 MW combined facility is considered conservative given the locations proposed for the plants. In addition, BESS are gaining popularity and many renowned manufacturers such as Tesla, AEG, MAN and Siemens, among others, offer reliable equipment. This is causing prices to drop, making BESS more cost effective. AySA’s approach to first pilot a small-scale system to gain experience and then evaluate whether to use BESS to improve power supply reliability or for power shifting is here considered to be sound.

84. The motors at the raw water pumping station at the San Martin WTP are among the oldest electromechanical equipment in AySA’s asset inventory, rendering their replacement well justified to make efficiency gains. The installation of VSDs is also well justified given that the water system in Buenos Aires has limited storage capacity, forcing WTPs and pumping stations to follow the demand curve relatively closely. VSDs will facilitate this operational need while allowing pumps to work near the optimal functioning point for each different demand level, and AySA has successfully installed VSDs in other pumping stations. In addition, reducing service pressure variability reduces stress on pipes and consequently the potential for breakages.

**C) Digital payments  
Objectives**

85. AySA's objective is to improve its commercial efficiency by increasing by 51 percent the volume of collection through three digital payment methods: (i) automatic debit, (ii) the internet and (iii) digitized Pagophone. This will reduce transaction costs, improve commercial productivity and reduce time spent by users on payment, as well as reducing human contact, critical in the context of the current pandemic.

### Beneficiaries

86. Beneficiaries include all of AySA customers who will benefit from more agile payment methods which do not require visits or physical interaction with AySA operators. Increasing the volume of digital payments by 51 percent is expected to lead to a 30 percent increase in the number of users paying through digital channels. Moreover, the lower pressure on commercial offices will allow staff to be assigned to tasks other than assisting users, improving the general productivity of commercial management.

### Method

87. Table 11 shows the amounts collected in 2018 and 2019 through different payment methods, showing that 52 percent of payments required users to visit AySA's offices or banks and non-bank entities in person. These payments require physical interaction between user and collector, transportation, bank and non-bank entities fees, physical spaces and personnel cost. Few payments are made by Pagophone because it is inefficient, requiring the user to interact over the phone with an AySA operator while he/she processes the payment through *Posnet*. This process could be digitalized with an automatic service, in turn freeing up resources for the customer center (*Centro de Atención Integral al Usuario* or CAIU).

Table 11: AySA's collection methods

Method of Collection	2018		2019	
	Amount (ARS)	%	Amount (ARS)	%
1. Banks and Non-Bank Entities	5,693,136,896	30.56%	8,869,088,543	30.99%
2. Automatic debit	3,324,177,512	14.84%	4,961,663,727	17.34%
3. AySA	4,197,181,758	22.53%	6,080,448,501	21.24%
3.1 Commercial office	3,683,144,487	19.77%	5,112,721,519	17.86%
3.2 Credit card	514,037,271	2.76%	967,726,982	3.38%
5. Internet and Online Payment	4,438,841,233	23.83%	7,290,272,627	25.47%
6. Telecollection y Pagophone	271,748,333	1.46%	366,370,302	1.28%
7. Tax interdeposit	705,890,722	3.79%	1,053,763,510	3.68%
TOTAL	18,630,976,454	100.00%	28,621,607,210	100.00%

88. The average amount per transaction through banks and non-bank entities is lower than other methods (see **Error! Not a valid bookmark self-reference. Error! Reference source not found. Error! Reference source not found.**), while average amount per transaction at AySA's offices is 320 percent of on line payments due to large payments connected to debt negotiation. Thus, reducing the number of non-digital transactions will significantly reduce average transaction cost.

Table 12: AySA collection method (number of transactions)

Collection channels	Number of transactions	Average amount per transaction (ARS)
1. Banks and non-bank entities	11,977,736	740.5

2. Automatic debit	2,820,727	1759.0
3. AySA office	1,324,847	4589.5
5. Networks, Internet and Online Payment	6,679,822	1091.4
6. Telecollection and Pagophone	218,111	1679.7

Table 13: Actions to be implemented by AySA to improve commercial operations

Action	Expected Impact	Description
Net Segmentation CAIU / PCI Standard	<u>Increased productivity of CAIU staff.</u>	a) A new server, bringing the total number to 2. These 2 servers will support the Interactive Voice Response (IVR) generating high availability and redundancy and expand the storage capacity to record calls from the CAIU b) IVR automation c) Independence of the IVR from the Main Central, thus complying with the Data Security Standard for the Payment Card Industry (Payment Card Industry Data Security Standard) or PCI DSS.
Equipment for Commercial Data Warehouse	<u>Greater business intelligence from AySA</u>	a) Increasing storage capacity by an additional 2Tb to avoid the need to erase historical series of information, allowing more efficient analysis of consumer behavior and payment without the need to resorting to back-ups. b) Increasing processing power enlarging RAM memory from 32 GB to 128 GB. c) Adjusting licensing rights to the new set-up through a target purchase of licenses for currently active software. <sup>51</sup>
Modernization of Contact Center	<u>Lower cost of communications</u>	AySA will transition from analog phone to voice over internet protocol (VOIP) <sup>52</sup> technology, updating current telephony equipment.
Telemetry of Large Consumers	<u>Higher billing and collection</u>	AySA will install 440 ultrasonic meters and "WaterMind" devices (Itron) for remote data transmission as a pilot experience covering 0.01% of its large metered users who account for 7.5% of total consumption. If successful, the pilot will be scaled up, as AySA currently has 325,000 private non-residential metered users.

89. With this data in mind and to improve commercial operations under the Program, AySA will focus on four activities, as presented in Table 13 **Error! Reference source not found.** In addition, AySA will improve digitalization by developing a mobile application and digitalizing services to increase efficiency (described in RA 3). In particular, the app will include billing and electronic payment services and progressively incorporate more virtual office functions.

### Assessment

90. **Error! Reference source not found.** summarizes the assessment of the four actions presented by AySA.

<sup>51</sup> Digital principles adhered by the World Bank Group (<https://digitalprinciples.org/>).

<sup>52</sup> IP phone lines or Voice over IP (VoIP) phone lines are an Internet-based telephony communication system. They allow integrating voice and data communications, also known as convergence or converged networks.

Table 14: Assessment Conclusions

Planned Action	Evaluation
<p><b>Net Segmentation CAIU / PCI Standard</b></p>	<p>Today the CAIU has 9 employees supporting customers via phone or analog systems for debit or credit card charges payments. In 2019 CAIU staff carried out 218,111 “manual” telephone card payment operations using Posnet, which is equivalent to around 800 daily payment operations. The project will allow more secure automatic digital payment and free up staff to complete more productive tasks.</p>
<p><b>Equipment for Commercial Data Warehouse</b></p>	<p>The greater capacity for analysis will lead to a greater contribution in terms of usefulness of information to improve billing management, collection, and detection of commercial irregularities.</p>
<p><b>Modernization of Contact Center</b></p>	<p>This action is characterized by low cost and much greater flexibility in the management of AySA communications.</p>
<p><b>Telemetry of Large Consumers</b></p>	<p>International experience shows that online telemetering of large users generates important benefits because it limits the human factor and contributes to improving the relationship with large users. An improvement of billing and collection is also expected, which will also lead to an improvement in digital collections</p>

91. The implementation of this digitalization process will require coordination under a technical and commercial leadership; for instance, to develop this project, dialogue with the user is as important as the technical challenges. Overall, these four actions plus the two mentioned in RA 3 constitute an adequate package for a digital transformation of AySA's commercial area, consistent with that of organizations of its size. In addition, the EIAP will include additional actions to further AySA's digital transformation including its commercial area. The first three actions will be carried out through the purchase of equipment and various internal developments (integration of equipment, adaptation of software and systems). The case of telemetry is designed as a pilot experience through a mix of internal developments, contracting and purchase of equipment. The procurement process for servers upgrading is already underway and the other activities are ready to launch, pending financing. The amounts provided considering the information provided by AySA are considered reasonable.

**2.5 Technical Soundness – Results Area 3 *Strengthen AySA’s capacity to respond to WSS emergency needs***

92. This RA will contribute to AySA's efforts to mitigate the impacts of the COVID-19 shock on its operations and will also reinforce AySA's systems to render them more resilient. The Program will strengthen AySA's PPE and support its strategy to streamline internal and managerial processes to become more agile in responding to shocks (epidemiological, climate-related or financial). At the same time, this RA will improve citizen engagement and support a gender program promoting equal career opportunities to women.

**A) Recognizing AySA's efforts in battling the COVID-19 outbreak by ensuring continuity and efficiency in service provision and the use of WBE (prior results verification)**

**Objectives**

93. AySA progressively adopted a package of measures to respond to the COVID-19 health emergency with a two-fold objective: (i) ensure continuity and efficiency in the safe provision of services to the population; and (ii) preserve and care for the health and physical integrity of its employees. These measures have already been implemented, as per AySA’s crisis management and coordination mechanisms, and are to be recognized as prior results. The response to the COVID-19 crisis by AySA is a subset of its broader PPE and is a testament to its capacity to expand the scope of its PPE to incorporate new risks and hazards and to activate its emergency response decision-making processes and coordination structure. The PPE includes guidelines for both proactive and a reactive stages and most measures adopted in response to the COVID-19 crisis are a part of the reactive stage, with the exception of WBE, which AySA sees as a promising tool to complement the traditional health surveillance system and support AySA’s ability to plan for and proactively prevent future outbreaks.

### Beneficiaries

94. Beneficiaries include AySA’s own employees, its providers, as well as the general population of AySA’s service area.

### Method

95. Table 15 presents the measures adopted by AySA as part of its response to the COVID-19 crisis.

*Table 15: Measures adopted by AySA*

Adopted measure	Description
Establishment of a Crisis Committee	A Crisis Committee headed by AySA’s President and composed of Senior Management Staff was formed to lead AySA’s crisis response. The Committee strengthened its commitment to work in a cooperative manner with the National, Provincial, Municipal governments, the City of Buenos Aires, as well as with local organizations and firemen. Under the guidance of the Committee, each Directorate reorganized its tasks accordingly, as required.
Teleworking arrangements and special leave permissions	For administrative profiles, supervisors and managers, the teleworking modality was implemented, with technical support available in case of inconveniences and / or emergencies.  As of March 16 2020, and as a result of the suspension of classes, special leave was granted for (i) parents with children of school age under their care, prioritizing gender equity, and (ii) employees identified to be at increased risk (over 60 years of age, with cardiovascular or cerebrovascular diseases, diabetic, asthmatic, immunosuppressed, and pregnant).
Establishment of minimum human and material resources to ensure and maintain services	A survey was carried out to establish the minimum personnel requirements that should be in place on AySA’s premises, in order to maintain services. For example, a minimum presence was established to ensure security, cleaning, maintenance and surveillance services of AySA’s facilities. In addition, each Operational Area adopted new arrangements or operating schemes to ensure the operation and inspection of wells, pumping stations, WTPs and WWTPs, and deferring non critical preventive maintenance tasks.  In the event that public transport would be paralyzed, a carpool system would be organized with AySA vehicles to ensure that the minimum staff could be in place to guarantee operations. In addition, personnel considered critical to perform these minimum requirements were granted permits to circulate in compliance with the current legal provisions. Permits of the same nature were granted to critical suppliers, and the provision of chemicals, services, materials and equipment essential for safe operations was ensured.

Awareness campaigns for employees	Awareness campaigns were carried out, communicating information necessary for the care of personnel, including on social distancing, hygiene and gender-based violence.
Prioritization of interventions to resolve technical grievances	<p>As the available capacity to solve technical grievances was reduced both in AySA, as well as in its contractors, the Regional Operations Directorate developed a new procedure for the solution of technical complaints, prioritizing interventions according to the severity associated with the complaint and potential impact on the population. In that sense, complaints were prioritized by <u>type of complaint</u> and by <u>type of user</u>, as follows:</p> <p><i>Prioritization by type of complaint:</i> 1. Lack of water, 2. Sewage drain clogging, 3. Quality: taste in drinking water and chemical smell from sewers, 4. Leaks of magnitude, and 5. All others.</p> <p><i>Prioritization by type of user:</i> 1. Hospitals and other health facilities, 2. Elderly care facilities/retirement homes, 3. Housing complexes, emerging/fragile neighborhoods within the service area, 4. Horizontal properties/buildings with more than 20 functional units, and 5. Remaining residential, non-residential and other users.</p> <p>Operators were informed that in the case of non priority complaints and users, the commitment to resolve technical grievances in 24 and 48 hours would not apply. Nevertheless, the grievance would be registered and attended to, when possible.</p>
Commercial office closings and promotion of online services	All online services were made available to help customers stay at home, including online payment options, as well as 20 other administrative procedures that can be processed remotely.
Suspension of service cuts and postponement of payment of water bills	<p>Service cuts to non-residential users and restrictions to residential users were suspended, as of March 17, 2020, and until further notice.</p> <p>Overdue bills during the mandatory quarantine could be paid without surcharges or interest until May 31, 2020.</p>
Delivery of water to underserved areas	<p>AySA organized the distribution of water and chlorine (<i>lavandina</i>) to assist isolated (far from urban centers) and vulnerable populations. More than 60 million liters of water for drinking and food preparation purposes, as well as 370,000 liters of <i>lavandina</i> for cleaning and disinfection, have been distributed since March 2020.</p> <p>Drinking water was delivered through different modalities, including by boat for residential customers in the Paraná Delta, in 1L plastic bags (<i>sachets</i>) in the municipalities of Merlo, Quilmes, Tigre, Lomas de Zamora and in CABA Social Intervention Management Units (UGIS), and in the form of water cans (<i>bidones</i>), in over 20 municipalities in the GBA.</p>
Development of safety and hygiene protocols for works which are part of A+T and C+T	In order to continue with the execution of the A+T and C+T programs within the framework of the COVID-19 health emergency, AySA developed in April 2020 an operational guide to guarantee adequate conditions in terms of prevention, safety and hygiene in the working environment, and avoid the spread of the disease among workers. The Guide presents recommendations and protocols to be observed by each worker before the start of works and at beginning of each working day.
Use of WBE as a early warning signal for future outbreaks	A team of professionals and researchers from AySA applied the quantitative polymerase chain reaction (qPCR) assays to the detection of SARS-CoV-2 in wastewater and verified the presence of viral genetic material in samples from the Buenos Aires sewerage network. The methodology will allow monitoring the evolution of the virus in different areas of Buenos Aires, and will complement the Ministry of Health's epidemiological surveillance system based on the number of clinical infected cases, providing a more detailed and complete picture of the progression or regression of the pandemic.

## Assessment

96. The information presented in the table above is drawn from a series of documents presented to the World Bank Team by AySA, namely a report on the measures taken (*Informe Plan de Prevención y Emergencias - COVID 19: Aislamiento Social Preventivo y Obligatorio. Acciones tomadas por AySA S.A.*), the guide on applying the safety and hygiene protocols for works which are part of the A+T and C+T programs, as well as the coronavirus prevention protocol (*Protocolo de Prevención del Coronavirus - Dirección Desarrollo de la Comunidad*). The level of detail in the documents provided was considered sufficient, although some of the more quantitative measures lacked detailed information, such as water distributed and associated beneficiaries, as well as cost implications and impacts of implementing these measures. Nevertheless, as further described below, AySA's response through this COVID-19 package is in line with good regional practices (see Figure 2), as well as with the WHO's Technical Guidance on "Water, sanitation, hygiene, and waste management for SARS-CoV-2" from July 2020.<sup>53</sup>



Figure 2: Examples of measures monitored by the "Water Security in times of COVID" Dashboard. (Colors indicates measure implemented; black = not implemented; grey = no data or not currently monitored)

97. In addition, the World Bank's LAC Water Global Practice Team compiled the measures set up by governments and utilities in the LAC region to help fight the pandemic and continue to provide safe water and sanitation services to their citizens. This information presented in the form of a dashboard (WSS Responses to COVID-19) continues to monitor measures introduced in 19 countries in the LAC region and 17 states in Brazil, and these technical, commercial and organizational measures generally focus on three main areas: (i) ensuring access, continuity, and quality, particularly critical for handwashing; (ii) direct support to cover service fees; and (iii) ensuring employee safety.

98. To respond to the COVID-19 emergency, AySA has worked to improve in each of these three areas:

- **Access, continuity and quality.** As recommended by the WHO, AySA paid extra attention to customers in vulnerable situations or underserved populations, by setting up emergency provisions to secure water supply, including by distributing water through boat, providing bottled water and chlorine or giving top priority to hospitals and retirements homes when technical issues threaten service quality. To secure service continuity, a temporary suspension of service disconnections was implemented. In terms of quality, AySA has maintained its full water quality monitoring capacity, even during staff rotation;

<sup>53</sup> <https://www.who.int/publications/i/item/water-sanitation-hygiene-and-waste-management-for-covid-19>.

- **Support to cover fees.** Payments due during the mandatory quarantine period were allowed to be deferred;
- **Employee safety.** As in most countries of LAC and states of Brazil, the focus in AySA has been on protecting the employees of utilities by promoting home-based work, personnel rotation, and closing offices, and developing protocols to ensure employee safety for those who have been identified as critical to the utility’s operations. AySA also decided to postpone all non-essential projects and maintenance work to minimize movements and exposure of its employees.

99. These sector response measures across the region reveal signs that the unforeseen health crisis has presented utilities with opportunities for enhanced connectivity, a crosscutting theme also observed across AySA’s response, as demonstrated by its efforts to reach out to the unserved populations, to enhance its relationship with customers and other stakeholders, and to accelerate its transition to digital solutions to make informed decisions throughout the lifecycle of its water and wastewater systems.

Table 16. Benchmarking of AySA’s WBE approach against international best practice

Components of WBE	Assessment of selected elements of AySA’s approach
<p>Procedures for the collection and storage of wastewater samples, including WRF recommendations on:</p> <ul style="list-style-type: none"> <li>• Worker safety</li> <li>• Wastewater system characteristics</li> <li>• Sample type, timing, and location</li> <li>• Sample frequency and duration</li> <li>• Sample collection, transport, preservation, and storage</li> <li>• Consistency in sampling methods</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Worker safety:</b> AySA has formed a commission with researchers from the Malbrán Institute to carry out infectivity tests on concentrated sewage samples and verified that pathogenic elements in the sewage matrix were indeed inactivated and did not have the ability to infect workers. Standard personal protective equipment (PPE) is being used, in line with WRF recommendations which stipulate that standard practices associated with WWTP operations should be sufficient to protect worker safety</li> <li>• <b>Sample type, timing, and location:</b> samples are taken from 43 manholes along the sewerage network, each at the outlet of a sewershed, as well as from 6 WWTPs representing 90% of the flow treated by AySA</li> <li>• <b>Sample frequency and duration:</b> weekly. One sample per week may be sufficient to adequately monitor a local outbreak, at least until a significant change in the signal is detected</li> <li>• <b>Sample collection:</b> composite samples are generally preferred over grab samples, though grab samples may be acceptable if composite sampling is not practical, and longer composite durations (e.g., 24-hour) will presumably give the most representative signal. AySA is using grab samples taken at specific moments of the day (morning), after having confirmed that no significant differences were noted when comparing results from composite sampling versus grab sampling campaigns.</li> <li>• <b>Sample preservation and storage:</b> samples for analysis should be stored at 4°C and analyzed as soon as possible (up to a maximum of two weeks), both recommendations observed by AySA.</li> </ul>
<p>Identification of the genetic signal of COVID-19 in wastewater samples, including WRF recommendations on:</p> <ul style="list-style-type: none"> <li>• Methods and analysis guiding principles</li> </ul>	<p>Protocols used by AySA have been developed using best practice, including assistance from the Dutch Water Research Institute (KWR) which pioneered the approach. AySA protocols use centrifugation as the concentration method and RT-qPCR for genetic extraction and assays.</p>

<ul style="list-style-type: none"> <li>• Quality Assurance / Quality Control (QA/QC)</li> </ul>	
Use of data, including for: <ul style="list-style-type: none"> <li>• Trends/changes in occurrence early detection of occurrence/reemergence</li> <li>• Assessment of community prevalence</li> <li>• Risk assessment</li> <li>• Viral evolution</li> </ul>	These aspects are currently taken care of by health authorities, and data (considered to be confidential) could not be shared with the World Bank Team
Communication, including WRF’s recommendations on: <ul style="list-style-type: none"> <li>• Guiding principles for effective communication</li> <li>• Roles and responsibilities</li> <li>• Communication tools</li> </ul>	These aspects are currently taken care of by health authorities

100. On the particular topic of WBE, AySA was the first utility in South America to implement WBE, which speaks to AySA’s capacity and level of preparedness in this area of expertise. AySA’s development and use of this approach is in line with best practices, such as described in the “Wastewater Surveillance of the COVID-19 Genetic Signal in Sewersheds. Recommendations from Global Experts” paper published by the Water Research Foundation (WRF), as a result of the “International Water Research Summit on Environmental Surveillance of COVID-19 Indicators in Sewersheds” from April 27 to 30, 2020. This paper includes recommendations on the potential uses of wastewater surveillance for tracking COVID-19 and on key components of WBE, as presented in Table 16.

**B) Strengthening of AySA’s PPE**

**Objectives**

101. Water and wastewater utilities face different kinds of risks that threaten their capacity to provide adequate services. In this regard, AySA has developed and periodically updates its PPE, internally titled Plan de Prevención y Emergencias (PPE), which consists of a set of guidelines aimed at avoiding or reducing the possibility of a risk occurring (Proactive Stage) or providing a quick and efficient response to an ongoing crisis (Reactive Stage). It involves actions such as diagnostics, evaluation, prevention, mitigation, preparedness, response and recovery, all of which are directly linked to the expectations, interests of and impacts on the different stakeholders. The PPE was triggered by the COVID-19 pandemic and AySA now aims to: (i) capture lessons learned through this experience dealing with the ongoing crisis; (ii) develop a contingency plan to deal with epidemiological risks to be incorporated into the PPE; and (iii) organize seminars for water and sanitation and health institutions to share their experiences throughout the crisis.

**Beneficiaries**

102. Beneficiaries include AySA’s own employees (particularly as some of the PPE measures are to be taken to avoid contagion in the workplace), as well as the general population part of AySA’s service area, as early detection of pathogens is critical to reduce their impact on the health of the population and on the economy.

**Method**

103. AySA's PPE follows the Hazard Analysis and Critical Control Points methodology (HACCP) and its risk identification and emergency management procedures match its operational processes. This, coupled with the fact that all operational procedures at AySA are ISO certified, provide a high degree of confidence that the PPE is relevant to AySA's operations and is reasonably up to date. AySA has an established methodology to update the PPE, which is being used regularly throughout the organization to keep the plan relevant and effective. Each area of the service provider reviews the relevant aspects of each risk affecting them and reports on changes in the key parameters conditioning the response to each risk.

104. The company also has a methodology to assess and respond to perceived or actual new risks consisting in identifying the risk, listing it in the PPE and developing a contingency plan associated to it. When the risk materializes or during an ongoing crisis, such as COVID-19, the contingency plan is updated using feedback from the different affected areas. AySA proposes to use the latter to summarize lessons learned and to develop a contingency plan to deal with potential microbiological risks like the ongoing COVID-19 pandemic. The contingency plan will follow a minimum content list included as an appendix to the verification protocol covering three stages: (i) Planning and prevention, (ii) Emergency management, and (iii) Recovery. This will be accompanied by the development of molecular biology tools, studies and procedures to allow for the detection, analysis and reaction to those threats so that the contingency plan includes the potential for early warning.

105. Each area responsible for a certain process that was affected by the current crisis will revise the impact of it in its operations and the effectiveness of the measures taken to overcome the situation and extract the main lessons in each case. They will also carry out a contextual analysis to reevaluate the impact of the emergency on their routines, performance and operational processes and propose the actions that will allow them to continue to deliver the services with minimum to no disruption. In addition, AySA will organize seminars with national and international institutions related to the water and sanitation and the health sectors to share their experiences during the COVID-19 emergency as well as share their progress with molecular biology tools. AySA will do this through the Federal Sanitation Entities Committee (*Comité Federal de Entidades de Saneamiento* or COFES), which groups the majority of the major water and sanitation service providers in Argentina.

### **Assessment**

106. Although AySA did not have sufficient time to plan and prepare for the COVID-19 emergency, the proposed contingency plan for epidemic risks is structured against the three main phases of an emergency plan: (1) Plan and prepare; (2) Emergency management and (3) Recovery to normal activity. This is done according to good practices, as it involves recognizing the possibility of a similar risk materializing, as well as preparing to deal with it by taking into account the experience gained and lessons learned from the current emergency.

107. The sample of documents analyzed, and the qualifications demonstrated during the direct interactions with the staff responsible for the PPE show professionalism in the way AySA manages its emergency response and recovery practices and provide confidence that this activity will yield a quality result. Furthermore, the proposed use of molecular biology tools, not only as a detection method but also as a tool for improving efficiency of treatment at WWTPs, is an indication that at least some of the parameters triggering the proposed contingency plan will be monitored regularly, making it quite relevant. With regards to the seminars, COFES has a long experience organizing this kind of events,

including virtual ones. This provides enough confidence that the seminars will be efficiently organized and will fulfill the foreseen purpose.

### C) Modernizing AySA's processes through digitalization and the incorporation of innovative technologies

#### Objectives

108. As a result of the sanitary crisis and the associated movement restriction and confinement policies adopted across the region, many utilities have initiated or accelerated their transition towards the use of digital platforms and tools to engage differently with their customers, as well as to remotely collect data on their assets and services. In the particular case of AySA, this transition to digital solutions had already been initiated (before COVID-19) and taken the form of a so-called *Plan de Sistemas*. The overarching objective of the *Plan de Sistemas* is to improve the overall productivity of the company, through a transversal advance in its digitalization transition.

#### Beneficiaries

109. Each action has its own objective and target beneficiaries, including improving the experience of customers or employees by streamlining processes or facilitating data sharing across departments, while other activities aim at directly improving efficiency as well as risk mitigation of AySA operations, and will thus more broadly benefit the population served by AySA (See table below for details on each activity).

#### Method

110. A wide range of areas within the company are targeted by this Plan, and the World Bank Team and AySA agreed to focus the DLI related to digital solutions on a reduced number of subcomponents from this Plan (5), which hold the potential for the most significant impacts. These subcomponents are summarized in the Table below.

Table 17: Subcomponents of the Plan de Sistemas

Activity	Description	Objective and beneficiaries	Estimated amount (MUSD)	Timeline (months)
1. Integration of human resources (HR) systems	Consolidation of AySA's 3 main HR systems, enabling the integration of critical information on the company's human capital.	-Improve employee experience and self-service capabilities -More efficient management of HR strengths, abilities and opportunities	2.5	12
2. Solutions to enable the remote work modality on a continuous basis	Comprehensive solution to enable the remote work modality, including virtual presenteeism control tools, continuous management of collaborative work in distributed environments and the necessary computer equipment	-Free up real estate space in buildings reducing costs associated with rent, energy, consumables, etc. -Staff motivation and retention	2	6
3. Predictive maintenance of main assets	Solutions such as advanced predictive analytics and artificial intelligence, digital	-Optimization of asset status -Anticipate asset failures, avoiding unforeseen events	1.4	12

	twins, dynamic 3D visualization, etc. will be evaluated and implemented, as well as the automatic generation of work orders	-Extend the useful life of assets. -Prioritize repairs and replacements -Optimize operational performance with fewer but more accurate alerts and better understanding of what is causing anomalies		
4. Digitalization of commercial processes in AySA's network of commercial offices	Digitalization of 100% of the commercial procedures carried out in AySA's commercial offices. Enables the subsequent remote and digital management of all commercial operations	-Increase the speed at which commercial procedures are managed -Eliminate the need for paper in business management -Increases customer satisfaction	1.2	12
5. Optimization of the customer complaint management system through the adoption of mobile and digital solutions	Handling of work orders through mobile devices, providing full real-time visibility of the deployed crews, managing logistics and optimizing management. This solution will provide mobile management, routing and traffic in real time, communication between work teams, collaboration and analytics of regional and centralized management in real time	-Improve speed and efficiency of operations taking place on public roads -Optimize assignments -Increase total productivity of field work -Extend capabilities, efficiency and scalability	0.9	6

111. In addition, AySA is considering expanding this Plan to incorporate new activities, such as the digitalization of inventory management through the use of QR codes, mobile devices and software to provide real-time information to and integrate with corporate systems, remote asset/system O&M through the use of augmented reality, the development of a capacity building virtual campus and large scale digital survey solutions. These activities have not been included in the below assessment, or in the definition of the DLIs.

**Assessment**

112. The COVID-19 crisis has demonstrated the importance of digitalization to help utilities maintain and monitor services while preserving the safety of their infrastructure, of their operators, as well as of the citizens. Digital solutions will also continue to play a critical role in the post-COVID-19 recovery phase, as utilities will seek to create opportunities for efficiency gains on the path to regaining their pre-crisis financial and commercial health, and will seek to improve resilience to shocks and their capacity to respond to emergencies. Indeed, digital solutions have the potential to enhance water utilities' ability to apply data science and augmented intelligence techniques to business, commercial and technical problems, in order to enable situational awareness or near-real time monitoring. These enhancements are critical to anticipate, mitigate, prepare for and recover from the effects of a hazard in a timely and efficient manner including the policy and planning, engineering, organizational, financial, social and

environmental aspects of disaster resilience. As mentioned above, AySA had initiated this transition before the COVID-19 crisis and has indeed accelerated its transition to digital since then.

113. The development of these activities is led by AySA's Department of Technology and the majority of these activities are ready to be bid. An analysis of the material received points towards adequate quality and strategic relevance, with the estimated costs in the correct order of magnitude. While it is estimated that not all proposed activities will have a high impact, certain activities will represent a quantitative and qualitative leap in the management of the processes they affect, specifically all those related to client relationship and digitalization of administrative procedures. Mobile solutions which affect field work, as well as the promotion of teleworking, will also be very effective and will increase the performance of operations. As for the activity related to a more proactive asset management approach, it is also likely that it will result in greater service availability and a smarter asset renewal strategy.

114. It should also be noted that timeliness of results deriving from these actions will differ greatly from one activity to another. The analysis indicated that results may be difficult to observe during the Program implementation period for certain activities, particularly for the ones requiring a year for completion (excluding bidding), as results for digital solutions often take time to materialize. Investments in digital solutions indeed take an average of 6 to 12 months to begin to bear the expected results, since the first stages of implementation include accommodation and adaptation to new procedures and tools. In certain cases, this initial period can even be associated with a reduction in productivity, which is nevertheless more than rewarded during the life cycle of a particular digital project. For example, the implementation of teleworking will bring almost immediate benefits, however, predictive asset management will require significant historical information for the associated algorithm to lead to conclusive results.

#### **D) Strengthening AySA's Capacity for Citizen Engagement, with a Focus on Digital Methods Objectives**

115. AySA has 3.6 million customers, 30 customer service centers, and receives 2.2 million complaints/requests per year. The vast majority (90 percent) of feedback is submitted via telephone, but there are also options to engage through mail, virtual and on-person office, web portal, email or social media. AySA receives 2.5 million annual visits to their web portal, with 643,000 registered users, and 85,000 service issues are reported online, with 62 percent of customer feedback via email, 22 percent via Facebook and 16 percent via Twitter. AySA's internal architecture to manage the PQRS is complex and is spread across various areas of the company. The current system presents limited options for technical complaints and does not have an option to provide open comments with formal follow-up. This weakens the relationship and trust of users who perceive the company as unresponsive and distant. Currently, the only space for submitting open comments is through social media, where neither the PQRS nor the responses are classified or tracked in a broader integrated system, generating greater frustration for citizens. Even before COVID-19, AySA faced historical challenges with citizen engagement.<sup>54</sup> However, with the implementation of social distancing and the forced closure of the on-person customer service centers, the opportunities to provide open feedback have been limited, saturating telephone lines. Unlike

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<sup>54</sup> AySA currently receives 90% of users' requests and consultations via telephone. This leads to saturation of call-in lines, contributing to long wait times and leaving requests unattended. Consequently, current challenges include attending all telephone calls, reducing wait times, and avoiding lost requests due to the lack of attention.

other public service companies in the region, AySA has limited interaction channels and does not have an app that can facilitate citizen participation. Strengthening digital and virtual forms of two-way communication and engagement between companies, governments and citizens will allow AySA to build trust and more flexibly respond to COVID-19 and other shocks.

116. Under the Program, AySA seeks to: (i) improve its processes for receiving and managing PQRS to better understand and respond to the perspective of citizens; and (ii) implement an integrated digital strategy that improves AySA's relationship with its clients by facilitating two-way engagement between users, citizens and the utility.

### **Beneficiaries**

117. All AySA clients should benefit from the improvements in the processes for receiving and managing PQRS, as the proposed activity will make the system more accessible, from the users' perspective, by introducing alternative ways of submitting complaints, beyond the current primary method of phone calls. In addition, all citizens in AySA's service area should ultimately benefit from the implementation of the integrated digital strategy which aims to improve AySA's relationship with its clients by facilitating two-way engagement between users, citizens and the utility. Once implemented, the strategy will facilitate the categorization of information, the provision of personalized user data, the integration of PQRS management, the incorporation of feedback from users, and the dissemination of service notices (such as service interruptions due to repairs or expansions in nearby neighborhoods).

### **Method**

118. The digital strategy for improved citizen engagement will focus on the execution of the following activities: (i) incorporation of a new mobile app for community engagement; (ii) development of a robust and integrated CRM; (iii) classification of PQRS and average response times; and (iv) improvement on response time. The incorporation of new technologies (i) and (ii) will allow for:

- i. *Rationalized Customer Data Management*: Consolidate information coming from customers and citizens via various channels into one coherent database.<sup>55</sup> This will also facilitate linking the database to other programs and platforms.
- ii. *Improved Customer Communication*: Building a CRM system enables a seamless communication to customers across media platforms.
- iii. *Timely Customer Two-Way Engagement*: The integration of such technologies will allow for real-time two-way digital engagement with consumers via a Chat function, or other channels such as WhatsApp. It would also allow customers to receive automatically generated service notices for issues such as service interruptions, network expansion in nearby neighborhoods, or new works.
- iv. *Organized Customer Feedback and Complaints*: Customer transactions, questions, complaints, suggestions and feedback would be digitalized in an organized form, allowing for greater traceability (and thus accountability) and facilitating a back-office dashboard that can display the data by, for example, municipality, service request, cooperative, or specific public works.

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<sup>55</sup> For example, a situation in which a customer submits a complaint through an app, then calls to follow up and then tweets is not categorized as three distinct complaints, but rather as one unique complaint. This consolidation is also important in providing coherent data on complaints and resolution times, versus having parallel databases by channel, with no coherent overview.

- v. *Greater Transparency on Public Works and Service Requests:* The technology would provide a back-office dashboard on the status of works and service requests. In the second phase, it will also provide more information to citizens on the status and progress of specific public works in their geographic area.
- vi. *Greater Ease of Use for the Customer/Citizen:* The integration of the communication portals via the CRM will provide the building blocks for a more integrated, one-stop shop customer and citizen experience by allowing for future linkage with other programs (e.g. billing, electronic payment, micro-metering).

119. Taking advantage of the elevated number of smartphones in Argentina,<sup>56</sup> as well as the experience of other regional utilities, AySA is incorporating a new digital channel (mobile app) for community engagement. The app will allow AySA to present its users, and the general public, with a new channel to overcome the limitations of traditional telephone contacts and share PQRS enriched with photos, geo-referenced information and comments. The app is scheduled to be implemented in at least two phases, the first one already under development. The first phase will also include a redesign of AySA's Virtual Office. Although AySA is developing a first version of the mobile app with a menu focused on 4 pre-defined types of PQRS,<sup>57</sup> within the implementation framework of the Program, the mobile app will incorporate other key PQRS, with the possibility of conducting open consultations. These changes will significantly improve the quality of AySA's relationship with users and citizens.

120. AySA is also making progress on structuring a solid and integrated CRM that will facilitate and optimize the monitoring of PQRS and their resolution, providing aggregated information to facilitate decision-making. The CRM will bring together the different communication channels available for users (telephone, web page, virtual and in person office, social media, mail and, after launch, the mobile app). The CRM will enable a dashboard to monitor the status of PQRS, identifying their typology (query, commercial claim, technical claim, etc.), status (order opening date, user, resolution status, etc.) and response and resolution times. Likewise, the CRM will allow the geolocation of PQRS and with it the possibility of viewing "hotspots" and trends. In this way, information will be available to streamline the decision-making process, improving the response and resolution times of PQRS. Once the CRM and mobile app are developed and launched, AySA will conduct a classification analysis of PQRS to identify the top 10 most frequent PQRS and the average response and resolution times for each. This will form a baseline which can be used to assess improvements in response and resolution times.

### **Assessment**

121. The integrated digital strategy will strengthen AySA's capacity to engage with citizens in a constructive and continuous way, improving the interface with citizens in the "virtual" modes that situations like COVID-19 have recently required. This increased participation is expected to improve real time feedback on the level of services provided by the company, perceptions of its capacity to respond to demands, its institutional behaviors, and its expectations. It is also expected that a better knowledge of its users and new technological possibilities will allow AySA, with agility and immediacy, to provide relevant and disaggregated information to users both on the quality of the service and on the challenges faced by the company. Consequently, it will be possible to provide avenues for virtual interaction between

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<sup>56</sup> In 2020 there are 32.5 million functional smartphones in Argentina.

<sup>57</sup> The pre-defined PQRS have been identified related to the most frequent technical complaints: lack of drinking water service, lack of pressure in drinking water service, and sewerage blockages with or without overflow in the household.

the community and the company on topics such as leakage reduction, demand management, business sustainability, resilience, climate change, emergency management and other important issues. For complex topics such as micro-metering, the improved citizen engagement mechanisms will smooth the process of explaining the benefits of the system, including water conservation.

122. From a social perspective, strengthening participation can foster trust and a positive evaluation between citizens and the company. Among other benefits, “digitizing” citizen participation and aggregating multiple channels of feedback and complaint into one system (CRM), allows greater accountability of PQRS systems. Technology can also provide avenues for greater voice for citizens who are otherwise less visible to existing community leadership structures (be they indigenous populations, slum dwellers, or other minorities). By having the CRM integrate, track and categorize PQRS from a variety of sources (telephone for example), less advantaged households and individuals without smart mobile phones will not be excluded from having their issues reflected in the aggregate data on consumer PQRS. Furthermore, this type of continuous virtual feedback is especially necessary in the current context (COVID-19) in lower income areas, where services are being extended and where it is important to understand how services and campaigns (such as handwashing behavior change campaigns) are being received by the community.

123. Based on the proposal for the design of the mobile app, the functionalities seem appropriate for the first iteration. AySA has informed the timeline for the implementation of phases 1 and 2 of the mobile app development (phase 1 is under development and is expected to finish in 3 months, and phase 2 is programmed to last 6 months). Costs are estimated in USD 720.000 for the two phases. The proposed technology, the layout and the design are comparable to other mobile apps in the market. AySA is incorporating the lessons learned from other utilities in Argentina who have already implemented such digital platforms. The specifications to assess the adequacy of the geo-referenced data, and the integration of some form of basic geolocation for key functionalities such as claims, reporting progress on works, and service interruptions would normally be part of the platform functionality are under development. AySA’s mobile app will be rolled out in two phases and presents similar functionalities to the existing ones from other service utilities, such as Edenor, Edesur, Metrogas or Camuzzi.<sup>58</sup> Nevertheless, functionalities related to technical claims are expected to be integrated later than expected (for the app’s second version). This could be justified, considering the background work needed to link AySA’s current PQRS systems with the CRM. Nevertheless, the implementation of such functionality is key to guarantee a two-way communication between user and utility. Overall, the proposed functionalities seem limited in comparison to those used by international water utilities. For example, other regional initiatives are including the possibility of anonymously reporting fraudulent activities of the utility’s employees or contractors in their digital channels, as well as simple georeferenced reports of complaints and PQRS status, open to all app users (whether a utility’s client or not). These components are not specifically mentioned as functionalities in AySA’s proposal.

124. Concerning its overall digital strategy, particularly the implementation of the platform, AySA is working with an interdisciplinary group within the company. Teams are coordinated by the communications officer and collaborate with other areas such as IT, communications, CRM, technical and infrastructure areas. It is noted that the lack of a formal organization or structure for the development of

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<sup>58</sup> Edenor and Edesur are the electricity utilities in GBA, whereas Metrogas and Camuzzi are gas providers in Argentina.

the digital initiative might lead to delays and technical challenges as a result of an unclear division of roles and responsibilities and the digital strategy can only succeed with the participation, inputs, buy-in and training of AySA's staff. It is expected that the incremental insertion of virtual engagement mechanisms will impact current work modalities. It is therefore essential that relevant teams can provide feedback on the development of the system, so that categories of PQRS are aligned with new demands and technological possibilities. It is recommended that AySA complete a background analysis of the readiness of their staff to incorporate and respond to this new form of more frequent and interactive virtual engagement. In addition, teams must be trained, both for the transition and for the new virtual modality. Staff should be part of the process of identifying platform requirements in order to collaborate in the identification of functionalities (usual areas of customer complaints, challenging problems, potential inconveniences at the time of launching the platform).

125. Among the general risks that AySA may face in its shift to more digital forms of citizen engagement, the following can be identified:

- i. Inadequate testing of the mobile app vis-à-vis internal and external stakeholders, contributing to low user satisfaction, and lack of streamlined processes for AySA users;
- ii. Insufficient internal preparation for the implications of digital real time engagement for AySA staff, which can lead to slow response times, or frustration at demands that are not easy to respond to and ultimately lower mobile application's use;
- iii. Inadequate integration of the app and CRM with other service functions of interest to consumers (leading to lower mobile app use);
- iv. Lack of public communication on the mobile app contributing to low use;
- v. Confusion among users if the new mobile application represents just the creation of yet another parallel channel for feedback, if not integrated with systems showing responses (traceability) or if data / feedback from other channels (telephone, social media) do not reflect data in at least the internal dashboard of the digital platform. This can lead to lack of coherence in citizen feedback, and the inability to use feedback and data from the APP to inform AySA's management decisions.

126. Nevertheless, it is important to highlight that further detail is needed regarding the design and implementation of the digital platform in order to adjust risks to projected activities.

## **E) Strengthening AySA's resilience and response capacity with an Integrated Gender Program Objectives**

127. The Program aims to support AySA in its Inclusion, Gender, Equal Opportunities and Treatment and Workplace Violence (IGEOTWV) program<sup>59</sup>, particularly by promoting equal career opportunities for women and improving working conditions for all AySA employees, with the goal of increasing women's representation in decision making positions, including in technical departments. For this, AySA will focus on revising their current promotion practices and setting targets for gender diversity representation in

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<sup>59</sup> *Política de Agua y Saneamientos Argentinos S.A en materia de inclusión / género, igualdad de oportunidades y trato, y violencia laboral (AySA, 2020).*

leadership positions<sup>60</sup>. By the end of the Program the aim is that 28 percent of the personnel in these positions are women, representing an increase of 6 points from the October 2020 baseline (22 percent).

### **Beneficiaries**

128. AySA's female employees and their direct circles will benefit most immediately from the Program's efforts. However, in the long-term, benefits will spread to the rest of the personnel who will work under a more diverse leadership team. As previously discussed, women have been differentially impacted by the crisis and it is important that AySA's leadership team recognizes those differential needs.

### **Method**

129. AySA's program on IGEOTWV is the result of the utility's and the union's<sup>61</sup> joint effort to promote respectful and fair treatment, diversity, inclusion and equal opportunities. The program is founded on five pillars: (i) Communication of the organization's culture: prevention and awareness; (ii) Permanent training; (iii) Implementation of positive impact policies; (iv) Health, hygiene and work safety; and (v) Prevention, treatment and safe management and implementation of adequate response to complaints that may arise in situations of harassment or other forms of workplace violence, by means of a specific protocol for these situations.

130. Consequently, AySA has adopted and is currently supporting several systematic measures in order to increase the participation of women in the company, improve working conditions and opportunities for advancement of women in the company and address horizontal segregation<sup>62</sup>. As part of its efforts to create better working conditions for women in AySA and as a result of the IGEOTWV program, the company has created two new protocols to address sexual harassment in the workplace, as well as domestic violence. Given the concerning increase in domestic violence cases reported in Argentina during the first months of the COVID-19 Pandemic, AySA has already begun to implement actions to address domestic violence and its impacts on female employees, including awareness raising campaigns.

131. To foment a more systematic approach to achieve greater gender parity in the organization, AySA has also designed a Gender Action Plan for the 2020-2025 period with eight focus areas. As part of its efforts to create a better working environment and increase the retention of female employees, care licenses will be extended for both women and men, these will include licenses for parents of adopted children. They are also conducting an assessment to determine the extent to which both parents are using these licenses and plan to launch communication campaigns to encourage fathers to use care-leaves. AySA has already launched a series of campaigns, including during the COVID-19 pandemic to encourage a more equitable division of labor in the household and question traditional gender roles. Two axes from AySA's gender action plan focus on promoting the participation of women in decision making positions, particularly in technical areas, where they have traditionally been underrepresented: their personnel redistribution program and their career and promotions program. The first program, looks for equal representation in internal movement of the company, assuring that vacant positions are covered 50

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<sup>60</sup> Leadership or managerial positions have been identified by AySA as the following categories: Directors (Directores/as), Managers (Gerentes/as) and Chiefs (Jefes/as).

<sup>61</sup> Sindicato Gran Buenos Aires de Trabajadores de Obras Sanitarias (SGBATOS).

<sup>62</sup> The company has noticed a lack of representation of women in technical departments and other position that have traditionally been held by men.

percent by women and 50 percent by men. Actions to help materialize this lines of work are detailed in Table 18Table 18.

*Table 18 Actions proposed by AySA to achieve more equitable career advancement opportunities for women and greater representation of women in decision making positions*

Area	Actions
Personnel redistribution program	All new calls for vacant positions must explicitly and directly incentivize women to apply.
	Communication and awareness campaigns will be carried out and targeted to different audiences, including women.
	Workshops and open talks will be held monthly to provide the required institutional framework to encourage women to complete needed trainings and apply to positions, historically held by men.
Career and Promotions	Specific trainings will be offered to women in order to foster women’s promotions and career growth, including technical training.
	The internal communications team will launch monthly campaigns to encourage women to apply to existing openings and promote the message that women can benefit and are part of change processes in AySA’s promotion systems.

132. In addition, AySA is part of the World Bank’s Equal Aqua Global Platform, which seeks to deepen gender diversity and inclusion in water institutions<sup>63</sup>. Being part of this platform will allow the utility to connect to other utilities worldwide that are facing, or have faced, similar challenges. Furthermore, Equal Aqua provides participating water utilities with a framework to analyze barriers and promising approaches to address challenges faced by women throughout their career cycles in water organizations, assessment tools, guidance on step-by-step processes to incite change and deepen gender diversity in water organizations, capacity building, and score cards that can help utilities assess where they stand in terms of gender diversity vis-a-vis global and regional averages. AySA has already completed a quantitative assessment using the World Bank’s HR questionnaire and is thus eligible to receive this personal scorecard with additional details, which will allow for a more precise assessment of the success of the policies already implemented to narrow gender gaps in the workplace. It has participated in multiple trainings and meetings, where partner utilities (and AySA) have presented on strategies they have adopted to address the differential needs of vulnerable staff and customers during the COVID-19 pandemic, as well as initiatives they have adopted to increase women’s representation in leadership positions.

### Assessment

133. Gender diversity has been linked to better financial performance and better governance and can therefore be directly linked to the objective of improving AySA's efficiency. For example, a study carried out by McKinsey among 345 companies in 6 Latin American countries shows that the significant representation of women on executive committees contributes to better financial performance. Companies with women on their executive committees had a return on equity and an average EBIT margin more than 40 percent higher than those companies without women on their executive committees<sup>64</sup>.

<sup>63</sup> Equal Aqua was established by the World Bank’s Water Global Practice with the support of Global Water Security and Sanitation Partnership in collaboration with several external partners.

<https://www.worldbank.org/en/topic/water/brief/inclusive-water-institutions-platform>

<sup>64</sup> *Women Matter: A Latin American Perspective – Unlocking women’s potential to enhance corporate performance* (McKinsey and Company, 2013). <https://www.femtech.at/sites/default/files/Women%20Matter%20Latin%20America.pdf>

Another study<sup>65</sup> shows that companies that have boards of directors with more gender diversity tend to have stricter monitoring systems, and less absenteeism, which contributes to better governance.

134. On the other hand, to respond to crises in a sustainable way it is important to be inclusive in the responses. COVID-19 has had diverse impacts on women and men- with the increase in responsibilities at home and due to cuts in companies and the greater representation of women in the informal sector, the gap in terms of access to work has increased. Employees in the water sector in various countries have reported a higher feeling of anxiety than their male colleagues due to increased responsibilities at home and fear of losing their job and women in different industries are considering downshifting their careers<sup>66</sup>. In addition, there has been an increase in domestic violence and sometimes harassment in the workplace since the start of the COVID-19 pandemic<sup>67</sup> which may reinforce women's decision to leave the workforce. Therefore, to prevent this, or any future crisis, from having an impact on the exit rate of women from the utility and worsen inequalities in women's representation rates at the management level, it is important to continue to implement measures that promote equity and create a work environment that allows employees to reconcile their work and personal balance, and AySA has already taken actions to respond to the needs of its employees during the COVID-19 crisis in that sense.

135. Data submitted by AySA through the World Bank's HR Questionnaire on gender diversity in water utilities shows that women are underrepresented in managerial positions at AySA. Currently, women represent 22 percent of managers in the company, compared to the regional average of 35 percent<sup>68</sup>, and are particularly underrepresented in managerial positions from technical departments. There are many factors that contribute to women's low representation in managerial positions. During the past 12 months, only 21.3 percent of promotions were granted to female staff compared to 78.7 percent of promotions granted to men. Further, only 18 percent of promotions at the managerial level were granted to women. In addition, the exit rate of women stands at 2.7 percent compared to 1.9 percent of men. Although exit rates for neither woman nor men are above global averages, women are leaving the company at higher rates than men.

136. AySA is reviewing their promotion practices and setting yearly gender targets to stimulate equal career advancement opportunities and address gaps in decision making positions. By year 5 of the Program AySA seeks to achieve a 6 point percent increase in female representation in leadership positions (resulting in 28 percent by 2025), by assuring gender parity in promotions, whereby at least 50 percent of those promoted in total and at the managerial level are women. To achieve such goals, besides establishing gender targets, the utility is launching targeted communication campaigns to encourage women to apply to promotion opportunities, focusing on providing training to fill women's technical or other capacity gaps, among others. Such actions are considered an integrative approach to address the gender-gap.

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<sup>65</sup> *Women in the Boardroom and their impact on governance and performance*. Journal of Financial Economics 94(2): pp. 291-309 (Adams and Ferreira, 2009)

<sup>66</sup> A recent study, *Women in the Workplace (Lean in and McKinsey, 2020)*, conducted among 317 companies in the United States found that one in four women are considering downshifting their careers or leaving the workforce due to the increased burden at home during COVID19. Among senior women considering stepping out, three out of four women attribute this to burn-out.

<sup>67</sup> UN Women reported that by April 2020 reports of domestic violence in Argentina had increased by 25 percent.

<https://www.unwomen.org/en/digital-library/multimedia/2020/4/infographic-covid19-violence-against-women-and-girls>

<sup>68</sup> World Bank Water Data. <https://wbwaterdata.org/breakingbarriers/tool/>. December 17, 2020. (Based on data from 9 LAC water utilities collected through the World Bank's HR Utility Survey including data submitted by AySA.

137. Qualitative assessment on the reasons driving promotion gaps, can help to ensure that actions proposed to narrow gaps in promotion and in managerial positions address their underlying reasons. Given the differences in the overall number of female and male staff, the target of 50 percent female promotions is high, the Program plans to monitor achievements in a yearly basis and will benefit from setting achievable yearly improvements in promotion rates to drive steady change, considering current challenges posed by the COVID-19 pandemic which might prevent women from seeking more responsibilities during the first year of the Program.

138. For the actions to be fruitful and the targets achieved, the proposed plan and actions must be both approved and endorsed by senior management. These must also be aligned with company objectives and business plans, allocating the necessary resources for their implementation. It is expected that during the Program, the needed protocols and plans are fully developed and implemented, following the needed institutional process to ensure new processes and policies are enforced and sustainable. Designing policies and actions to address existing inequalities is an important first step but setting up mechanisms for successful implementation and monitoring is also key.

### 3 Institutional and Implementation Arrangements

139. AySA will lead the implementation of the Program. The Directorate for IBRD and CAF loans, which is housed in AySA's General Administrative Directorate, is in charge of all aspects of Program monitoring and reporting to the World Bank. This Directorate includes a Program Coordination Unit (PCU) which will be maintained for the purpose of this Program. This unit currently houses one director, three managers, and 9 technical staff including mainly fiduciary, administrative and monitoring and evaluation (M&E) functions and serves as a coordination unit with all other Departments in AySA in charge of planning, implementing and monitoring of the PMOEM.

140. The PMOEM is a responsibility of AySA's General Directorate of Planning. The following departments within this Directorate have functions related to the PMOEM:

- i) The Directorate of Technical Planning is responsible for the design of the PMOEM at a technical level. It works closely with the Directorate of Engineering and Design, which is responsible for the specific infrastructure projects after the planning stage.
- ii) The Directorate of Coordination and Monitoring is responsible for monitoring implementation of the PMOEM.
- iii) The Directorate of Community Development is responsible for community engagement and the development of socio-technical initiatives, such as A+T and C+T, hence leading activities linked to the expansion of WSS in vulnerable settlements. It includes the Community Promotion Office that manages the relationship with project affected people and the local community in general, in coordination with different regional directorates.
- iv) The Technical Directorate for Technological Development is in charge of updating AySA's PPE and the Directorate of Information and Technology is responsible for the development and implementation of the digitalization strategy.
- v) The Directorate for Sustainability is responsible for implementing a comprehensive Environmental and Social Management System for AySA and carrying out the environmental and social supervision of works.

141. In addition, there are three other departments that are also related to the Program. Procurement of contracts for large works is a responsibility of the Directorate of Contracts and Management Control, and the Directorate of Purchases and Storages is in charge of the acquisition of goods and services. The Hygiene and Safety Management Unit, within the Directorate of Human Resources, is responsible for ensuring the integrity of AySA's personnel and the Company's assets, preventing and minimizing occupational health issues and accidents, complying with and enforcing pertinent regulations, and implementing good practices on the matter. The Directorate of Legal Affairs is responsible, among other functions, for the verification and monitoring of compliance with environmental and health and safety legal requirements of AySA's facilities. And finally, the Directorate of Human Resources is responsible for human resources issues and will serve as the entity in charge of implementing the gender policies and guidelines.

142. The key responsibilities of the PCU include: (i) coordinating the overall implementation of the Program; (ii) preparing periodic monitoring reports on the progress of the different activities and contribution towards DLIs; (iii) monitoring progress of the different procurement processes; (iv) informing AySA's Board and the Secretariat of Strategic Matters under the President's Cabinet on progress in Program implementation; (v) ensuring that the different departments in AySA submit periodic follow-up and evaluation reports; (vi) ensuring that the designs and implementation of activities are performed in accordance with the Program's conditions agreed to by the Bank; (vii) specifying the reasons for plan deviations, if any, and propose remedial actions; (viii) preparing periodic Program Reports for the Verification Agent (VA); (ix) preparing progress monitoring reports on compliance with the agreed actions in the PAP; (x) preparing financial statements of the Program; and (xi) preparing requests for disbursement of funds based on VA reports.

143. The PCU has solid experience in implementing complex projects and is taking the necessary actions for programming and budgeting. The PCU is the same unit in charge of coordinating all actions related to the Matanza-Riachuelo Basin Sustainable Development project (P105680), financed by the World Bank. It will ensure adequate support for administrative and financial management of the Program facilitating compliance with the agreed objectives; plan the calendar under which disbursements will be made according to the projections; and analyze and present the Program audited financial statements. The PCU will also coordinate with the corresponding departments in charge of Environmental, Health and Safety and Social management. The PCU will verify the degree of compliance with contractual obligations and keep the accounting records permanently updated.

144. Activities under the A+T and C+T programs are implemented in coordination with the corresponding municipalities, and Table 19 presents the responsibilities of actors involved in these intrahousehold connection programs.

*Table 19: Responsibilities and implementation arrangements for intra household connections*

Stakeholder	Main responsibilities
AySA	AySA is responsible for: (i) preparing relevant studies (including social viability analyses); (ii) determining the technical feasibility of works; and (iii) managing the corresponding approvals from municipal authorities. AySA is also in charge of training cooperative members, designating site inspectors and approving the executed works. Once approved, AySA notifies APLA that it is incorporating the works into the concession, then operates the service and bills users according to the approved tariff structure.

<b>Municipalities</b>	In their capacity as executing agencies of the works, they are responsible for: (i) identifying and prioritizing project locations; (ii) presenting a proposal of planned works to AySA and requesting the associated funding; (iii) collaborating on the formation and registration of work cooperatives; (iv) managing the execution of the works, through professionals hired for these tasks; (iv) presenting the executed works to AySA for approval, and collaborating with the service provider to ensure the effective incorporation of the beneficiaries to the network; and (v) assisting in sealing any alternative water sources used by households before they are connected to the network.
<b>Cooperatives</b>	Their core responsibility is the correct performance and execution of works financed by the Program. Furthermore, they must guarantee the attendance of their members in training activities. Cooperatives assume full and exclusive responsibility for compliance with legal, tax, social security and any other regulations that govern their actions.
<b>APLA</b>	Monitors the progress of A+T and C+T Plans, execution of the works, and the level of investments.
<b>ERAS</b>	Responsible for assessing the beneficiaries' eligibility for the Social Tariff, when applicable.

## PART B – PROGRAM EXPENDITURE FRAMEWORK

### 4 Expenditures

#### 4.1 Budget Classifications

145. Transfers to AySA are appropriated and allocated based on:

- (i) an organizational unit classification code: 1.1.1.91.00.000-*Obligaciones a Cargo del Tesoro* (National Public Sector), where the code reads as Non-Financial (1); National Administration (1); National Central Administration (1); and Jurisdiction (91) - referred to as “**Jurisdiction 91**” in simple terms;
- (ii) an economic classification<sup>69</sup>: “Transfers” (5) and a sub-function classification of “Transfers to other entities from the National Public Sector” (5) - referred to as “**Code 55**” in simple terms;
- (iii) a source of financing code: National State (**Source 11**), and transfers from loans obtained by the National State from the multilateral bodies (**Source 22**);
- (iv) a program code: Financial Assistance to Public Entities and other Entities (**Code 95**);
- (v) a functional classification: Social Services (**Code 3**) and Water and Sanitation (**Code 8**); and
- (vi) the distinction between recurrent (**Code 21**) and capital (**Code 22**) costs.

146. It is important to highlight that in the above-mentioned classification reflecting the Transfers to AySA, no distinction is made for the financing being provided for the PMOEM specifically (as this is not a separately identified program or activity in the National Budget). This distinction is made by AySA internally using its own processes and systems, and reliance will thus need to be placed on AySA’s own budgeting and accounting information systems, instead of using the National Budgeting system, to track the use of the funds allocated to the PMOEM. AySA’s budgeting and accounting information systems are able to track the expenditures incurred under the Program using accounting policies consistent with national public sector policies/standards, however close implementation support will need to be provided by the Bank to help establish the arrangements to produce the Program Annual Financial Statements. The Program’s budgeting transactions will be also be processed through e-SIDIF under the general budget code/line specified above (and UEPEX with respect to Source 22 financed expenditures) after having been processed through AySA’s own budgeting and accounting information systems.

#### 4.2 Review of the Program Composition by Expenditure Categories / Type of activity

147. Table 20 details the Program’s expenditures by sub-program and also by Results Area. A more detailed version of this table, including budgeting and or accounting lines/codes is included in the Operations Manual, indicating each Program expenditure in detail. This more detailed version will be used to track the Program expenditures during implementation as well as to facilitate the audit of the Program’s Financial Statements (and ultimately the overall Program expenditure reconciliation). The nature of the expenditures in RA 1 to be incurred is predominantly civil works contracts in specific municipalities of AySA’s jurisdiction with the associated operating costs of the main WTP and WWTPs. RAs 2 and 3, in addition to works contracts and corresponding operation costs, also includes goods contracts.

148. For the larger Program expenditure corresponding to the water and sanitation infrastructure investments, unit costs are efficient due to the large economies of scale of the Program, with an overall US\$430 per capita figure, considering full capacity of the newly built facilities in the long term (720,000

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<sup>69</sup> There are nine economic classifications (Personnel Costs, Goods to Consume, Non personnel Costs, Goods to Use, Transfers, Increase in Financial Assets, Debt Service and Liability Repayments, Other Costs and Figurative Costs) and 67 subfunctions.

beneficiaries by 2030, and an investment of 312 million – full investment in RA 1). By the end of the Program, when some of the facilities such as the Norte WWTP will still be working at partial capacity, this ratio would be around US\$700 per capita, which is still considered within reasonable limits. Within these costs, the ones associated to the connectivity program are the lowest given the high sunk costs in the form of already existing infrastructure (US\$91 per person in the case of water and US\$325 for sewerage connections). The main reason why sewerage connections are more expensive is due to the need to bypass and seal the different typologies of existing onsite solutions that each household may have. For the large infrastructure, the cost of the two WWTP expansions (72 million and 12 million) is also considered efficient for the size and treatment capacity as well as characteristics (with nutrient removal) of these facilities. In Florencio Varela, investments for water supply infrastructure are estimated at US\$ 49 million, including civil works at the pumping station and initial trunk main, and are considered reasonable when compared with similar infrastructure in the LAC region of the same size.

149. For RA 2, the costs of pipe replacement per kilometer (117,650 US\$/km) and value of water recovered of (0.11 US\$/m<sup>3</sup>), as well as the cost/benefit ratios of energy saving interventions (0.07 US\$/kWh) when compared with similar utilities, are considered to be logical. The investments related to digital solutions in RA 3 are relatively small compared with the benefits and savings they can bring to AySA in terms of gained capacity to respond fast and in a more tailored manner to customers, translated into higher service quality standards and customer satisfaction. These activities also imply a hidden cost in the form of a steep learning curve for AySA's technical staff and they have a strong learning by doing characteristic. The expenditure framework includes quantifiable costs related to concrete measures implemented during the COVID-19 crisis. However, AySA's response to the pandemic implied a broader set of measures difficult to monetize, such as the internal reorganization of staff, implementation of remote work modalities, quarantines, prevention campaigns, etc. Lastly, AySA's costs associated with the achievement of DLI 7 on gender relate to internal activities linked to staff costs (such as training sessions, workshops to sensitize staff, etc.), which are difficult to quantify in monetary terms.

150. The execution rates proposed for the different activities rationally fall within the implementation period of the Program. The activities which take longer to implement are the new modules of the Jagüel and Norte WWTPs (two years) which is within normal ranges for works of this magnitude. There is a risk of delays in the execution of the intrahousehold connectivity program since part of the works need to be conducted inside the households and dwellers may feel reluctant to allow workers inside their homes during the pandemic. The main mitigation measures are the adoption of safety measures following AySA's health protocols, the promotional campaigns conducted in the beneficiary areas before the start of the works, and the extension of the timeline to execute these works by 6 months, from 1.5 to 2 years.

Table 20: Program Expenditure Framework

Title of the Program or sub-Program		PforR Results Area	Total Program	Program's expenditure projection						
				2020	2021	2022	2023	2024	2025	2026
<i>sub-program 1: Improvements and Expansion of Services</i>										
Intrahousehold connections	Water	1	\$ 3 676 000	\$ -	\$ 662 000	\$ 3 014 000	\$ -	\$ -	\$ -	\$ -
	Sewerage	1	\$ 26 061 000	\$ -	\$ 1 955 000	\$ 16 288 000	\$ 7 818 000	\$ -	\$ -	\$ -
Water Basic Infrastructure	Florencio Varela	1	\$ 49 232 000	\$ -	\$ 3 726 000	\$ 33 531 000	\$ -	\$ 2 927 000	\$ 9 048 000	\$ -
Sewerage Basic Infrastructure	Planta Norte optimization Module III	1	\$ 72 600 000	\$ -	\$ -	\$ 7 284 000	\$ 16 754 000	\$ 48 562 000	\$ -	\$ -
	Planta Norte optimization Module I and II	1	\$ 1 827 000	\$ -	\$ -	\$ 1 827 000	\$ -	\$ -	\$ -	\$ -
	Planta Norte sewerage networks	1	\$ 94 438 000	\$ 1 448 000	\$ 6 565 000	\$ 24 766 000	\$ 19 410 000	\$ 23 523 000	\$ -	\$ -
	El Jagüel plant optimization	1	\$ 12 100 000	\$ -	\$ 1 210 000	\$ 3 025 000	\$ 7 865 000	\$ -	\$ -	\$ -
	El Jagüel sewerage networks	1	\$ 52 071 000	\$ 2 666 000	\$ 4 228 000	\$ 5 495 000	\$ 7 627 000	\$ 16 085 000	\$ 786 000	\$ 524 000
<b>Total sub-Program 1</b>			<b>\$ 312 005 000</b>	<b>\$ 4 114 000</b>	<b>\$ 18 346 000</b>	<b>\$ 95 230 000</b>	<b>\$ 59 474 000</b>	<b>\$ 91 097 000</b>	<b>\$ 9 834 000</b>	<b>\$ 524 000</b>
<i>sub-program 2: Improvements and Maintenance</i>										
Leak reduction Program		2	\$ 106 743 000	\$ 927 000	\$ 6 541 000	\$ 40 758 000	\$ 39 530 000	\$ 18 479 000	\$ -	\$ -
equipment		2	\$ 16 698 000	\$ -	\$ 5 844 000	\$ 8 349 000	\$ 2 505 000	\$ -	\$ -	\$ -
<b>Total sub-Program 2</b>			<b>\$ 123 441 000</b>	<b>\$ 927 000</b>	<b>\$ 12 385 000</b>	<b>\$ 49 107 000</b>	<b>\$ 42 035 000</b>	<b>\$ 18 479 000</b>	<b>\$ -</b>	<b>\$ -</b>
<i>sub-program 3: Operations</i>										
Energy efficiency: Energy monitoring and solar pannels		2	\$ 8 047 000	\$ -	\$ 908 000	\$ 908 000	\$ 5 324 000	\$ 908 000	\$ -	\$ -
Development of Digital Payment Channels Program		2	\$ 3 751 000	\$ -	\$ 908 000	\$ 1 936 000	\$ 908 000	\$ -	\$ -	\$ -
Strategy		3	\$ 22 500 000	\$ 288 000	\$ 6 580 000	\$ 6 436 000	\$ 4 598 000	\$ 4 598 000	\$ -	\$ -
COVID-19 Assistance and Contingency Plan		3	\$ 1 111 000	\$ 1 111 000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total sub-Program 3</b>			<b>\$ 35 409 000</b>	<b>\$ 1 399 000</b>	<b>\$ 8 396 000</b>	<b>\$ 9 280 000</b>	<b>\$ 10 830 000</b>	<b>\$ 5 506 000</b>	<b>\$ -</b>	<b>\$ -</b>
<i>Other Expenditures</i>										
Program's operational expenditures (WWTP and WTP OPEX)			\$ 100 000 000	\$ 14 286 000	\$ 14 286 000	\$ 14 286 000	\$ 14 285 714	\$ 14 286 000	\$ 14 286 000	\$ 14 286 000
Evaluation and Verification costs			\$ 5 000 000	\$ 750 000	\$ 750 000	\$ 750 000	\$ 750 000	\$ 750 000	\$ 750 000	\$ 500 000
Front-end fees IBRD			\$ 750 000	\$ 750 000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total other expenditures</b>			<b>\$ 105 750 000</b>	<b>\$ 15 786 000</b>	<b>\$ 15 036 000</b>	<b>\$ 15 036 000</b>	<b>\$ 15 035 714</b>	<b>\$ 15 036 000</b>	<b>\$ 15 036 000</b>	<b>\$ 14 786 000</b>
<b>Total Program</b>			<b>\$ 576 605 000</b>	<b>\$ 22 226 000</b>	<b>\$ 54 163 000</b>	<b>\$ 168 653 000</b>	<b>\$ 127 374 714</b>	<b>\$ 130 118 000</b>	<b>\$ 24 870 000</b>	<b>\$ 15 310 000</b>

### 4.3 Financial Sustainability and Funding Predictability and Adherence to Government priorities

151. Law No. 27.467 on the National Budget for the year 2019 allocated transfers to AySA for the fiscal year ending on December 31, 2019 for works (costs of acquisition or construction of assets used to provide the service) in the amount of ARS 15,562 million (including loans from multilateral entities belonging to Source 22). Nine budgetary changes were subsequently made, and in summary, during the year ending on December 31, 2019, AySA had received transfers from the National State amounting to ARS 21,737 million (ARS 10,181 million related to Source 11, ARS 11,507 million to Source 22 and ARS 49 million from other sources). From the start of the concession and up to December 31, 2019, the Company had received transfers from the National State of ARS 85,689 million.

152. The financial sustainability of AySA has to be strengthened to reach at least full operating cost coverage on a routine basis (including maintenance, rehabilitation and depreciation) and reduce dependency with regard to national funding, which may be subject to the country's macroeconomic situation. AySA is seeking efficiency gains as a means to improve its financial sustainability and cost-recovery ratio via the implementation of an adequate asset management strategy to prioritize rehabilitation works, lower technical losses and improve energy efficiency<sup>70</sup>. All these targets (network renewal, loss reduction, energy efficiency) are explicitly mentioned in the PMOEM 2019-23.

Table 21 Budget vis-à-vis Actual Expenditures, from 2014 to 2019

1000's of AR\$	Allocated Budget					
	2014	2015	2016	2017	2018	2019
<b>Operating Costs</b>	<b>5,059,336</b>	<b>6,960,974</b>	<b>10,919,347</b>	<b>16,032,648</b>	<b>20,004,529</b>	<b>28,500,395</b>
<b>Investments</b>	<b>5,812,913</b>	<b>8,817,212</b>	<b>11,523,520</b>	<b>18,591,306</b>	<b>22,907,880</b>	<b>25,278,604</b>
<i>Improvement and Maintenance</i>	<i>1,638,749</i>	<i>3,094,999</i>	<i>4,352,839</i>	<i>5,573,152</i>	<i>4,565,000</i>	<i>5,500,000</i>
<i>Expansion</i>	<i>4,174,164</i>	<i>5,722,214</i>	<i>7,170,681</i>	<i>13,018,154</i>	<i>18,342,880</i>	<i>19,778,604</i>

1000's of AR\$	Budget Execution					
	2014	2015	2016	2017	2018	2019
<b>Operating Costs</b>	<b>5,043,613</b>	<b>7,013,931</b>	<b>10,468,436</b>	<b>14,550,486</b>	<b>19,736,981</b>	<b>29,890,733</b>
<b>Investments</b>	<b>5,648,673</b>	<b>6,782,796</b>	<b>9,653,481</b>	<b>17,744,759</b>	<b>20,149,482</b>	<b>25,214,065</b>
<i>Improvement and Maintenance</i>	<i>1,628,213</i>	<i>2,271,790</i>	<i>3,472,358</i>	<i>4,487,493</i>	<i>5,856,239</i>	<i>5,678,288</i>
<i>Expansion</i>	<i>4,020,461</i>	<i>4,511,006</i>	<i>6,181,123</i>	<i>13,257,266</i>	<i>14,293,242</i>	<i>19,535,777</i>

Percentage	Budget Outturn					
	2014	2015	2016	2017	2018	2019
<b>Operating Costs</b>	<b>99.69%</b>	<b>100.76%</b>	<b>95.87%</b>	<b>90.76%</b>	<b>98.66%</b>	<b>104.88%</b>
<b>Investments</b>	<b>97.17%</b>	<b>76.93%</b>	<b>83.77%</b>	<b>95.45%</b>	<b>87.96%</b>	<b>99.74%</b>
<i>Improvement and Maintenance</i>	<i>99.36%</i>	<i>73.40%</i>	<i>79.77%</i>	<i>80.52%</i>	<i>128.29%</i>	<i>103.24%</i>
<i>Expansion</i>	<i>96.32%</i>	<i>78.83%</i>	<i>86.20%</i>	<i>101.84%</i>	<i>77.92%</i>	<i>98.77%</i>

<sup>70</sup> Due to the flat topography of the provision area, a large number of pumps are required to operate the service, which generates important electricity costs. At the end of 2015, electricity tariffs went up, affecting AySA's production costs and making AySA the fourth largest consumer of electricity in the country.

153. It is important to point out that the objectives of the PMOEM 2014-18 were not met mainly because of budgetary constraints. Moreover, the unplanned incorporation of nine municipalities in AySA's provision area between 2016 and 2018 increased operational expenditures, further reducing its capacity to invest and fulfil the PMOEM's targets. AySA staff did indicate that while the National Government has mostly been supportive of AySA, that due to fiscal restrictions in place during the last two years, AySA has not always received the transfers that it required from the National Government, and that in 2019 this led to the suspension of a number of works contracts for a certain period (that have subsequently recommenced their activities). The PMOEM is also partly financed from Source 22 financing (external aid), which evidences support of donors' aid flows to the Program. AySA has a high degree of autonomy in budget execution, within the parameters of the approved PMOEM, and has a high institutional capacity. The Program is not protected by revenue earmarking mechanisms and consequently there is no protected share of the Program.

154. There is a reasonable expectation that the required resources will be appropriated in the financial years when required. Nevertheless, this is an issue that requires close monitoring during supervision, to ensure the necessary resources are made available to AySA and that the Program is a high enough priority that it survives any budget cuts.

Table 22: Results Framework for PDO-level indicators

Name	Definition	Baseline	End target	Units	Frequency	Data source	Methodology data collection	Responsibility of data collection
Number of households gaining access to safely managed drinking water services (Access)	Households that will gain access to safely managed water supply either by the construction of the internal household connections or by improving water quality of their supply	0	35,000	Households	Biannually	AySA, confirmed by VA	Specified in the VP	AySA/ Cooperatives
Number of households gaining access to safely managed sanitation services	Households that will gain access to safely managed sanitation by the construction of the internal household connections or by the expansion of primary wastewater infrastructure	0	76,359	Households	Biannually	AySA, confirmed by VA	Specified in the VP	AySA/ Cooperatives
Annual savings from operational and commercial efficiency measures (\$/year)	AySA's annual savings from the reduction of water losses, energy efficiency and improvements in the efficiency of bill collection. The targets corresponding to these three efficiency factors are 4,953,466, 2,375,100, and 2,200,000 US\$/year, respectively. The calculation methodology is included in the Operations Manual	0	9,528,566	\$/year	Biannually	AySA, confirmed by VA	Specified in the VP	AySA
Number of AySA emergency response mechanisms strengthened	These are 2 mechanisms : (i) the strengthening of AySA's PPE with the COVID-19 Contingency Action Plan; and (ii) the implementation of AySA's digitalization strategy, which includes the digitalization of internal systems, namely: 1) consolidation of human resources systems; (2) enabling the remote work modality; (3) enabling the predictive maintenance of assets; (4) digitalization of commercial processes; (5) optimization of the customer complaint management system; and (6) development of AySA's Citizen Engagement Strategy.	0	2	Actions	Biannually	AySA	Specified in the VP	AySA

## PART C – PROGRAM RESULTS FRAMEWORK AND MONITORING & EVALUATION

### 5 Results Framework and Disbursement Linked Indicators (DLIs)

#### 5.1 Results Framework

155. The main results measured by the Program are in line with the PDO and are grouped by the three RA mentioned previously in the document: (i) improving access to safely managed WSS services, with a focus on vulnerable areas of Buenos Aires, (ii) improving AySA’s efficiency, and (iii) increasing AySA’s capacity to respond to WSS emergency needs. Table 22 above presents the Results Framework for the PDO-level indicators.

#### 5.2 Disbursement Linked Indicators (DLIs)

156. The following table includes the selected DLIs and corresponding sub-DLIs, which will provide incentives to achieve the objectives set under each RA.

Table 23: DLIs definition

RA	DLI	Name	Sub-DLI	Definition
RA 1 Expansion of WSS services, with focus on vulnerable areas	1	Number of HH gaining access to safely managed water services. Scalable	1.1. Number of HH gaining access to safely managed water services living in fragile neighborhoods	Households in fragile neighborhoods that will gain access to safely managed water supply either (i) through the construction of the intrahousehold connections in areas of 16 municipalities of peri-urban Buenos Aires where the water network and service pipes already exist, or (ii) by improving water quality in the municipality of Florencio Varela.
			1.2. Number of HH gaining access to safely managed water services living in non- fragile/formal neighborhoods	HH in non-fragile/formal neighborhoods that will gain access to safely managed water supply by improving water quality in the municipality of Florencio Varela.
	2	Number of HH gaining access to safely managed sanitation services. Scalable	2.1. Number of HH gaining access to safely managed sanitation services living in fragile neighborhoods	Households in fragile neighborhoods that will gain access to safely managed sanitation through the construction of intrahousehold connections in areas of 16 municipalities of peri-urban Buenos Aires where the sewerage network and service pipes already exist and are connected to a WWTP. In 7 of those municipalities additional works to expand primary wastewater infrastructure will also be needed.
			2.2. Number of HH gaining access to safely managed sanitation services living in non- fragile/formal neighborhoods	HH in non-fragile/formal neighborhoods that will gain access to safely managed sanitation through the expansion of primary wastewater infrastructure in 7 municipalities of peri-urban Buenos Aires.

RA 2 Improve AySA's efficiency	3	Preparation and adoption of AySA's EIAP		The EIAP will include a minimum content acceptable to the Bank entailing the identification of efficiency improvement initiatives and goals including the expected effect in AySA's financial sustainability. It will cover, at least i) NRW reduction (implementation of DMAs, installation of consumption meters, etc.); ii) Energy efficiency (equipment renewal, installation of variable speed drives, power factor correction, etc.); Efficiency improvement in other areas (automation, remote monitoring and operation, etc.) and iv) Commercial efficiency (improved billing and collection, etc.).
	4	Implementation of AySA's EIAP	4.1 Increase in Operational Efficiency (OE) KPI	Measures AySA's improvements in NRW (in saved m <sup>3</sup> /day) and energy efficiency (measured in saved kWh/m <sup>3</sup> ). The KPI is normalized in order to homogenize savings of different nature, measuring them in US\$/day. Scalable.
			4.2 Increase in Digital Payment share (DP) KPI	Percentage increase in the use in AySA of Efficient (Digital) Payment Channels compared to less efficient payment channels. Efficient payment channels are those that imply lower commissions charged to AySA, lower costs in logistics resources and shorter times and costs for users.
RA 3 Strengthen AySA's capacity to respond to water supply and sanitation emergency needs	5	Implementation and Strengthen AySA's PPE	5.1 COVID-19 contingency measures implemented	This sub-DLI will monitor the implementation of measures related to the COVID-19 response, to be recognized as prior results, including: (i) the operationalization of the Crisis committee; (ii) the delivery of 60,163 m <sup>3</sup> of water and 370 m <sup>3</sup> of disinfectant delivered to 23 municipalities within the PBA; (iii) the facilitation of remote working arrangements for AySA staff; (iv) the development of awareness campaigns for AySA employees about precautions to be taken during the COVID-19 pandemic outbreak; (v) the implementation of safety protocols for AySA's A+T and C+T programs; and (vi) the use of the WBE method to monitor the presence of COVID-19 in sewage.
			5.2 Preparation of the epidemiological risk contingency plan	Prepare a Contingency Plan to deal with epidemiological risks, using lessons learned from the response to the COVID-19 pandemic. This plan will boost the effectiveness of AySA's response to incidents and help minimize the impacts of a wider variety of potential epidemiological hazards including the COVID-19 epidemic. The features of the Contingency Plan are included in the Verification Protocol.
	6	Implementation of Digital Solutions	6.1 Implementation of Digital Solutions for Internal Systems	Implementation of 5 digital and innovative technology solutions to better anticipate, mitigate, prepare for and recover from the effects of a hazard in a timely and efficient manner, as well as continue with critical activities during emergency

			situations. The list of verifiable measures is included in the Verification Protocol.
		6.2 Digital strategy for citizen engagement	Implementation of mobile app and CRM system to improve AySA's customer relations and citizen engagement, by broadening the digital communication channels, incorporating feedback from users, providing tailored information and improving reception and management of claims, questions and suggestions, ending in the improvement of response times. The disbursement is scalable related to 5 milestones of the strategy detailed in the Verification Protocol.
	7	Increase in share of women in leadership positions in AySA	The DLI will measure the increase in the percent of women's representation at management level positions, thus reflecting efforts made by AySA in promoting equal career advancement opportunities for women and improving working conditions for all AySA employees.

**DLI 1. Number of HH gaining access to safely managed water services (US\$ 36 million)**

157. This DLI is scalable and will measure the number of HH gaining access to safely managed water services through: (i) the installation of the internal piping to effectively connect houses in fragile neighborhoods where the water network and service pipes already exist; or (ii) the provision of quality water to the Florencio Varela municipality. This DLI is divided into two sub-DLIs according to the fragility of the HH, and the amount to be disbursed for each HH located in a fragile neighborhood is higher compared to a HH located in a non-fragile/formal neighborhood (US\$1,238 versus US\$895).

- Sub-DLI 1.1. Number of HH gaining access to improved drinking water services living in fragile neighborhoods, for which 13,625 HH have been pre-identified; and
- Sub-DLI 1.2. Number of HH gaining access to improved drinking water services living in non-fragile/formal neighborhood, for which 21,375 HH have been pre-identified.

**DLI 2. Number of HH gaining access to improved sanitation services (US\$ 87 million)**

158. This DLI is scalable and will measure the number of HH gaining access to safely managed sanitation services (sewerage connected to a functioning WWTP), through: (i) the installation of the internal piping to effectively connect houses in areas with existing sewers and service pipes; or (ii) the construction of sewerage collection and treatment infrastructure that will allow for coverage expansion in unserved areas. This DLI is divided into two sub-DLIs according to the fragility of the HH, and the amount to be disbursed for each HH located in a fragile neighborhood is higher compared to a HH located in a non-fragile/formal neighborhood (\$1,381 versus \$1,004).

- Sub-DLI 2.1. Number of HH gaining access to improved sewerage services living in fragile neighborhoods, for which 27,400 HH have been pre-identified; and
- Sub-DLI 2.2. Number of HH gaining access to improved sewerage services living in non-fragile/formal neighborhoods, for which 48,959 HH have been pre-identified.

**DLI 3. Preparation and adoption of AySA's Efficiency Improvement Action Plan (EIAP) (US\$ 20 million)**

159. This DLI disburses against the preparation of AySA’s EIAP, which structures actions to be implemented to improve operational and commercial performance including the expected effect in AySA’s financial performance. The EIAP will aim to reduce costs or improve revenues, without considering service expansion projects, and will incorporate annual evaluations in four lines of action: (i) NRW reduction, (ii) energy efficiency improvements, (iii) commercial efficiency improvements (billing and collection), and (iv) productivity improvements. The EIAP will consider both long (20 years) and short (5 years) term horizons and will incorporate the actions, activities or projects included in existing relevant AySA plans, such as those included in the PMOEM on NRW reduction and energy efficiency, as well as incorporate measures to improve the efficiency of business operations and processes, billing, collection, and overall business productivity. The EIAP will also include: (i) a monitoring plan specifying how results will be measured, and (ii) a methodology to review objectives and targets according to the results obtained.

160. In order to trigger the disbursement associated with this DLI, the EIAP should include the following aspects: (i) an in-depth diagnostic taking into account the technical, economic, cultural, social, legal and environmental restrictions impacting AySA's performance; (ii) a clear and precise identification of initiatives and actions contributing to improving operating costs coverage with internally-generated funds or to reducing operating costs per functional unit (in both cases, as demonstrated by a “with and without project” comparison); (iii) the prioritization of initiatives and actions, by weighting the contribution of each of them to the above-mentioned operating costs-related objectives; (iv) a feasibility-level definition of the selected initiatives and actions, in the case of works, and an analysis of alternatives in the cases of “soft” actions, the replacement of equipment or other situations not requiring a feasibility study; (v) a study to improve the general collection rate (both current billing and past-due revenue); and (vi) the official adoption of the EIAP by means specified in the verification protocol.

**DLI 4. Implementation of AySA’s Efficiency Improvement Action Plan (EIAP) (US\$ 100.3 million)**

161. The implementation of the EIAP will be monitored by the status of pre-defined key performance indicators (KPIs), which take the form of sub-DLIs. The disbursement will be related to the degree of achievement of the KPIs.<sup>71</sup>

Sub-DLI 4.1. Increase in AySA’s operational efficiency through Program improvements in NRW and energy efficiency (OE-KPI) (US\$ 90.3 million)

162. This KPI measures improvements in NRW reduction (measured in recovered m<sup>3</sup>/day) and energy efficiency (measured in saved kWh/day). The KPI is normalized in order to give flexibility to AySA in achieving the target and is measured in US\$:

$$OE\ KPI = c_1 * A \frac{m^3}{day} + c_2 * B \frac{kWh}{day}$$

Where  $c_1$  and  $c_2$  are normalization factors that reflect the unit benefit for each improvement type, as considered in the financial analysis.  $c_1$  will consider the present value of deferred investments in production capacity, the variable production cost and the reduction in network maintenance costs derived

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<sup>71</sup> Discounting the first lump sum disbursement linked to the preparation of the EIAP, the remaining DLI amount will be assigned with equal weights to the three KPIs. Disbursement linked to the implementation on the EAIP are proportional to the degree of achievement of KPIs.

from the reduced number of pipe bursts due to new/rehabilitated pipes and  $c_2$  will take into account the reduction in energy consumption and in maintenance costs associated with the new equipment installed. The unit values of  $c_1$  and  $c_2$  are  $0.11 \text{ \$/m}^3$  and  $0.07 \text{ /kWh}$ , respectively.

163. The value of the “A” factor ( $\text{m}^3/\text{day}$ ) is calculated by adding up the volumes of water recovered from:<sup>72</sup> (i) network renovation/rehabilitation (with an end target of  $61,174 \text{ m}^3/\text{day}$ ). The calculation of the volume of water saved through pipe renovation will be carried out using data obtained from previous pilot projects which link the length of renovated pipelines to daily  $\text{m}^3$  savings; (ii) leak repairs. The Burst and Background Estimate (BABE) methodology will be used to estimate these savings (with an end target of  $51,000 \text{ m}^3/\text{day}$ ); (iii) network sectorization or creation of DMAs ( $1,2000 \text{ m}^3/\text{day}$ ); and (iv) the renovation of the Saavedra lifting station ( $10,000 \text{ m}^3/\text{day}$ ). The target value is  $123,374 \text{ m}^3/\text{day}$ .

164. The value of the “B” factor ( $\text{kWh}/\text{day}$ ) will be calculated by measuring the energy consumption after the interventions and comparing it with the baseline energy consumption before the interventions. The interventions which have been considered are the ones listed in the technical soundness sections of this document and include: (i) the monitoring of wells and wastewater pumping stations; (ii) large water lifting stations (Saavedra and San Martin); and (iii) generation of electricity from renewable energy sources. The target value is  $92,960 \text{ kWh}/\text{day}$  (or  $33.93\text{GW}/\text{year}$ ).

165. The end target for OE-KPI is  $20,078 \text{ US\$/day}$  composed of roughly two thirds in savings from NRW reduction and one third from energy efficiency.

Sub-DLI 4.2. Increase in share of digital payments relative to all other forms of payment to AySA by customers (DP-KPI) (US\$ 10 million)

166. The DP-KPI is a scalable KPI measuring the evolution of the use of “Efficient Digital Payment Channels”, considered to be those implying lower commissions charged to AySA, lower costs in logistics resources and shorter times and costs for users. These, in a modernization process, should be the “desirable” means of payment which should lead to an increase in the share of digital payment (DP). In particular, DP are expected to increase by 51 percent.

$$DP - KPI = \frac{DP_{program} - DP_{baseline}}{DP_{baseline}} * 100$$

Where  $DP_{baseline}$  and  $DP_{program}$  are the payments done digitally (automatic debit, internet, Pagophone) before and after the implementation of the Program, respectively. The baseline value is 43 percent and  $DP_{program}$  is expected to reach 65 percent.

**DLI 5. Implementation and Reinforcement of AySA’s PPE (US\$ 20 million)**

167. This DLI will disburse against: (i) the implementation of a COVID-19 package of measures implemented by AySA during the pandemic, to be recognized as prior results; and (ii) the update of its PPE with the development of a contingency plan to deal with epidemiological risks. These actions will strengthen the ability of AySA to respond in an agile manner to future shocks, ensuring the continuity of water supply and wastewater services, and will recognize AySA’s efforts in having successfully responded

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<sup>72</sup> Note that results connected to pressure management activities are discarded.

to the ongoing COVID-19 crisis, including through its leadership in incorporating WBE into the wider health surveillance system.

Sub-DLI 5.1. COVID-19 contingency measures implemented (US\$ 15 million)

168. This sub-DLI monitored the implementation of a number of measures related to the COVID-19 response, to be recognized as previous results. These are:

- Crisis committee in AySA is operational
- Remote working arrangements made for at least 2,500 AySA staff
- Rearrangement of human resources to guarantee the water service
- Awareness campaigns delivered among AySA's employees about precautions during the COVID-19 pandemic outbreak;
- Delivery of water and bleach to vulnerable areas. In particular, 60,163 m<sup>3</sup> of water and 370 m<sup>3</sup> of disinfectant delivered to 23 municipalities within the PBA between July 16, 2020 and December 30, 2020;
- Implementation of safety protocols for AySA's A+T and C+T programs; and
- WBE method to monitor the presence of COVID-19 in sewage and complement the Borrower's Ministry of Health's surveillance system implemented.

169. A lump sum disbursement of US\$ 15 million will be made once the implementation of these measures is verified according to the verification protocol.<sup>73</sup>

Sub-DLI 5.2. Preparation of the epidemiological risk contingency plan (US\$ 5 million)

170. These actions will boost the effectiveness of AySA's response to incidents and help minimize the impacts of a wider variety of potential epidemiological hazards including the COVID-19 epidemic:

- A. Production of a document that systematizes the lessons learned during the emergency;
- B. Preparation of the Contingency plan for epidemiological risk;
- C. Organization of virtual seminar for national and international institutions to share: i) their experiences dealing with this emergency and ii) on the advances in molecular biology to detect SARS-CoV-2 and other pathogens.

171. The contingency plan will include a minimum content, as described in the appendix to the Verification Protocol, covering the three stages of (i) Planning and preparation, (ii) Emergency management and (iii) Recovery to normal operations.

172. A lump sum disbursement of US \$5 million will be made once the implementation of these actions (A-C) is verified according to the verification protocol.<sup>74</sup>

**DLI 6. Implementation of Digital Solutions (US\$ 33 million)**

Sub-DLI 6.1 Implementation of Digital Solutions for Internal Systems in AySA (US\$ 26 million)

173. This scalable DLI will monitor the implementation of measures revolving around digitalization and the use of innovative technology to better anticipate, mitigate, prepare for and recover from the effects of a hazard in a timely and efficient manner, as well as continue with critical activities during emergency situations. The scalable disbursement of this DLI will be proportional to the number of measures

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<sup>73</sup> Note that the following measured will need to have occurred after July 16, 2020

<sup>74</sup> Note that the following measured will need to have occurred after July 2020

implemented and the implementation of each component will disburse US\$ 5.2 million. The list of foreseen measures, specific baseline and results to verify the satisfactory implementation of these activities are summarized in **Error! Reference source not found.**Table 24.

Table 24: Activities baseline and results definition for DLI 6.1

Activity	KPI	Baseline	Result
Integration of human resources (HR) systems	Number of interfaces in the HR department.	0 interface	24 in total automated. 50% during the following 3 months after the start-up of the first stage action.  50% during the following 3 months after the implementation of the second stage action
Predictive maintenance of main assets	Number of assets/ equipment incorporated in the scheme	0	278
Solutions to enable the remote work modality on a continuous basis	Percentage of mobile devices to enable remote working	900	1260
Digitalization of commercial processes in AySA's network of commercial offices	Increase in Digitalized Processes	50% of the commercial procedures are managed digitally	100% of the commercial procedures managed for a total of 14 procedures
Optimization of the customer complaint management system through the adoption of mobile and digital solutions	Percentage of work crews with mobile devices	0%	100%

Sub-DLI 6.2. Implementation of digital strategy for citizen engagement, including mobile app and customer relationship management system ("CRM") (US\$ 7 million)

174. This DLI will disburse against the completion of a number of activities whose end result is to facilitate a two-way engagement between user, citizen and the utility, allowing, among others, the categorization of information, the incorporation of feedback from users, the integration and management of PQRS. These include:

- (i) *Incorporation of a new digital channel (mobile app) for community engagement.* AySA will develop and launch a mobile app this will allow its users to present PQRS enriched with photos, geo-referenced information. The mobile app is designed in phases. Although the first version will contain predefined categories for PQRS, within the framework of the implementation of the Program, it will incorporate other typified requests and the possibility of conducting open consultations.
- (ii) *Development of a solid and integrated CRM.* This system will facilitate and optimize the monitoring of the PQRS, their resolution levels, providing aggregated information that will facilitate decision-making. The CRM will bring together the different communication channels

- available for users (telephone, web page, virtual office, social networks, mail and after launch, the mobile app) and will allow to have a dashboard to monitor the status of PQRS, identifying their typology (query, commercial claim, technical claim, etc.), status (order opening date, user, resolution status, etc.), response / resolution time. Finally, the CRM will allow the geolocation of PQRS and with it the possibility of viewing “hotspots” and trends. In this way, information will be available to streamline the decision-making process, improving the rates and response times and resolution of PQRS.
- (iii) *Classification of PQRS and average response times.* Once the CRM and mobile app are developed and launched, a classification analysis of PQRS according to frequency and average response times, will take place. This assessment will be carried out to identify the top 10 frequent PQRS and the average response / resolution times for each of them. This will allow for the construction of a baseline, for assessing improvements in response times
  - (iv) *Improvement on response time.* After 12 months of the development of the protocol concerning centralizing responses to the company's PQRS and the assessment of response times is conducted, a 15% improvement in the resolution time should be verified, according to the average time established for each type in the baseline.
  - (v) *Incremental improvement on response times.* After 24 months of the development of the protocol concerning centralizing responses to the company's PQRS and the assessment of response times is conducted, a cumulative 20% improvement in the resolution time should be verified, according to the average time established for each type in the baseline.

175. Disbursements will be made after the satisfactory completion of the activities (see Table 25).

Table 25 Disbursement conditions for the digital strategy for citizen engagement

Activities	Percentage to be disbursed	2021	2022	2023	2024	2025	2026
(i) Incorporation of a new digital channel (mobile app) for community engagement	20 %	D	V				
(ii) Development of a solid and integrated customer resource management system (CRM).	20 %	D	D	V			
(iii) Classification of PQRS and average response times.	20 %			D	V		
(iv) improvement on response time.	20 %					V	
(v) Incremental improvement on response time.	20 %						V
Total	100 %						

#### DLI 7. Increase in share of women in leadership positions in AySA (US\$ 3 million)

176. This DLI is scalable and will assess the success of AySA's policies concerning gender, inclusion and equal opportunities by measuring the percentage of women in leadership positions<sup>75</sup> in AySA. The baseline for this indicator is 22 percent and the forecasted result by the end of the Program is 28 percent. Disbursement will be made according to the increment in the percentage points achieved, according to:

$$DLI 7_{gender} = \frac{G_{Program} - G_{baseline}}{G_{target} - G_{baseline}}$$

where:

$$G_{Program} \stackrel{\text{def}}{=} \frac{\sum \text{Women in leadership positions}}{\sum \text{Personnel in leadership positions}}$$

$$G_{baseline} = 0.22$$

$$G_{target} = 0.28$$

### 5.3 Disbursement Linked Indicators and Results Matrix

177. The DLI matrix disbursement is summarized in Table 26, and represents a simulation conducted jointly with AySA to match disbursements and the rate of Program implementation and its associated expenses. It is to be noted that disbursements in the first two years are lower than the 60 percent of the total financing of the PforR.

Table 26: DLI matrix disbursement (Indicative disbursements per year)

	Total Financing Allocated to DLI (US\$)	As% of Total Financing Amount	Indicative timeline for DLI achievement				
			Year 1	Year 2	Year 3	Year 4	Year 5
<b>DLI 1</b>	<b>35 998 375</b>	<b>12.03%</b>	<b>0</b>	<b>9 856 956</b>	<b>2 523 044</b>	<b>23 618 375</b>	<b>0</b>
DLI 1.1	16 867 750	5.64%	0	9 856 956	2 523 044	4 487 750	0
DLI 1.2	19 130 625	6.39%	0	0	0	19 130 625	0
<b>DLI 2</b>	<b>86 994 236</b>	<b>29.07%</b>	<b>3 027 152</b>	<b>22 344 000</b>	<b>28 256 890</b>	<b>31 454 409</b>	<b>1 911 785</b>
DLI 2.1	37 839 400	12.64%	3 027 152	13 810 000	15 425 770	5 109 700	466 778
DLI 2.2	49 154 836	16.43%	0	8 534 000	12 831 120	26 344 709	1 445 007
<b>DLI 3</b>	<b>20 000 000</b>	<b>6.68%</b>	<b>5 000 000</b>	<b>15 000 000</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>DLI 4</b>	<b>100 250 639</b>	<b>33.50%</b>	<b>2 500 007</b>	<b>41 472 266</b>	<b>33 715 713</b>	<b>22 562 653</b>	<b>0</b>
DLI 4.1	90 250 610	30.16%	0	35 197 738	32 490 220	22 562 653	0
DLI 4.2	10 000 029	3.34%	2 500 007	6 274 528	1 225 494	0	0
<b>DLI 5</b>	<b>20 006 750</b>	<b>6.69%</b>	<b>15 000 000</b>	<b>5 006 750</b>	<b>0</b>	<b>0</b>	<b>0</b>
DLI 5.1	15 000 000	5.01%	15 000 000	0	0	0	0
DLI 5.2	5 006 750	1.67%	0	5 006 750	0	0	0
<b>DLI 6</b>	<b>33 000 000</b>	<b>11.03%</b>	<b>7 900 000</b>	<b>22 300 000</b>	<b>2 800 000</b>	<b>0</b>	<b>0</b>
DLI 6.1	26 000 000	8.69%	6 500 000	19 500 000	0	0	0
DLI 6.2	7 000 000	2.34%	1 400 000	2 800 000	2 800 000	0	0
<b>DLI 7</b>	<b>3 000 000</b>	<b>1.00%</b>	<b>760 000</b>	<b>500 000</b>	<b>500 000</b>	<b>500 000</b>	<b>740 000</b>
<b>Total</b>	<b>299 250 000</b>	<b>100%</b>	<b>34 187 159</b>	<b>116 479 972</b>	<b>67 795 647</b>	<b>78 135 437</b>	<b>2 651 785</b>

<sup>75</sup> Leadership positions are those where the person in charge is responsible for team and has predefined objectives. These positions include in their definition the following title: Directores/as (Directors), Gerente/as (Managers) and Jefes/as (Chiefs).

## 6 Risks and Mitigation Measures

178. The overall risk from a technical perspective is considered to be “Moderate”, and Table 27 presents the main risks and mitigation activities proposed to be implemented via recommendations, technical assistance or binding actions contained in the Program Action Plan.

Table 27: Identified risks.

RA	Risk / Assumption	Mitigation Measures	Risk level
All	AySA has difficulties to collect timely monitoring information on the Program status, given the variety of activities and number of departments in AySA involved in Program implementation	Reinforce the Program Coordination Unit with technical staff in charge of monitoring and evaluation activities, as per Program Action Plan (Action 1)	Moderate
1	COVID situation affecting / delaying works to connect households in vulnerable neighborhoods.	Adoption of safety measures following AySA’s health protocols, promotional campaigns conducted in the beneficiary areas before the start of the works, and the extension of the timeline to execute these works by 6 months, from 1.5 to 2 years	Moderate
1	The design of the new modules in the Norte and Jagüel WWTPs may present opportunities for greater efficiency in terms of CAPEX and OPEX that are not considered.	AySA can accept the support of Technical Assistance to review proposed designs thus helping AySA in the identification and consideration of such opportunities.	Moderate
1	Risk of uneven uptake of water and sewerage connections within vulnerable neighborhoods due to HH opting out of the program, returning to unimproved water sources. This could reduce the environmental and public health benefits and/or lead to HH feelings of exclusion.	Targeted social outreach and communications campaign that explains the affordable social tariff, the benefits of safely managed intra-HH connections	Low
1	Risks of recurrent flooding damaging newly built household connections made under the Program	Clear communication of the Verification Protocol, which declares household connections located in floodable areas as ineligible unless flood mitigation plans are adopted	Moderate
3	Development of a mobile app and CRM system with focus on commercial management or lack of	Technical assistance to incorporate innovative approaches to promote stakeholder inclusive processes, is an opportunity that AySA can consider	Low

	consideration of users' needs into design, given that it is developed with a conventional approach that limits two-way communication functionalities for the interaction between user and utility.		
3	The new digital tools may provoke internal organizational changes in the medium and long term.	It is recommended that AySA conducts an assessment on how further digitization (process automation) will modify current processes and relationship in the commercial area and other areas of the company to adapt the organization and develop human resources.	Moderate
3	Impossibility to achieve target of promotion rates for women linked to lack of experienced or sufficient qualifications female personnel, and/or limited pool of candidates as Program evolves.	Communication campaigns and trainings on soft skills should be intensified or targeted to specific to potential promotion candidates, preparing them for future opportunities. Activities such as mentoring by female colleagues in leadership positions can motivate younger women navigate the organizations hierarchy.	Moderate

**7 Program Monitoring & Evaluation**

**7.1 M&E System and Capacity**

179. AySA uses a results framework for M&E and for each investment, it mandates an inspection unit composed in 90 percent of the cases of its own employees. For larger infrastructure however, this inspection role can be contracted out due to requirements of multilateral investments banks or lack of capacity. With data provided from the inspection team, AySA's investment area (*Area de Inversión*) updates its Works Monitoring System (*Sistema de Seguimiento de Obras* or SSO) which records financial and physical progress.

180. AySA has adequate M&E capacity, including a tool (SARWeb) that can be used to evaluate the performance of the different Program activities, particularly the HH connections and the efficiency improvements of RA 2. AySA staff are already familiar with SARWeb, which can flexibly assign tasks, set reminders, and manage documentation such as surveys and photos. The independent VA will be selected through an international bidding process, and the World Bank Team is proposing the use of the KoBoToolbox platform and AySA's internal reports to verify the completion of the activities according to the verification protocol. SARWeb and KoBoToolbox are similar and compatible tools, and the World Bank will ensure that they are able to share data effectively to facilitate the monitoring and verification processes.

**7.2 Disbursement arrangements**

181. The VA will be responsible for: (i) the confirmation of baseline results; and (ii) the annual evaluations of the achieved results. For the former, the present Technical Assessment provides provisional baseline data for DLIs and KPIs, but the VA will be required to further assess and confirm its validity. For the latter, annual results will be verified through a combination of physical inspection and document analysis which can test the accuracy and quality of the results claimed to have been achieved. In addition,

as the procurement process to recruit the VA will not be completed in time for the verification of the prior results (see DLI 5.1) to be conducted in a timely manner, temporary verification arrangements will be followed to verify these prior results, involving the hiring of a credible third party by AySA.

182. On the basis of these two steps (baseline, annual achieved results), the VA will prepare a Results Verification Report which will be shared with the PCU and the Bank. For each DLI, allocated amounts, baselines, yearly targets, conditions of achievement, advance payments, deadlines for achievement are described in Section 6 and summarized in Table 26: DLI matrix disbursement. The Results Verification Report will help determine the amount of the eligible disbursement to be made, and if the disbursement request meets the terms of the Loan, the World Bank will proceed with the disbursement of the corresponding funds to the Ministry of Economy. In addition, AySA will be required to demonstrate through its regularly prepared financial statements the amount of internal financing and other multilateral donors.

### 7.3 Verification Protocol

183. The VA will be contracted by the GoA through AySA, under Terms of Reference acceptable by the Bank. The verification protocol is detailed in the Operations Manual (OM) and Table 28 summarizes its main elements.

Table 28: DLIs verification table (At the time of Program Appraisal)

DLI definition	Sub-DLI/KPIs	Scalable	Protocol to evaluate the achievement of the DLIs and data/result verification		
			Data source/agency	VA	Procedures
1.Number of HH gaining access to safely managed water services	1.1	yes	AySA will provide: Shapefiles including information on (i) fragile neighborhoods database: UREM (including RENABAP) and ABC, and location of beneficiary neighborhoods and eligible connections, (ii) water quality tests to establish baseline, (iii) information on floodable areas. Details are included in the Operations Manual	TBD	HHs must be within the preidentified fragile areas of the municipality (UREM, RENABAP or ABC). HH connections are completed after loan signature date. The VA will define a representative random sampling size with confidence level 95% and the maximum permissible error (e): 5%, and ensure that the connections are working. Distributed water to new connections complies with water quality regulations specified in the OM. Full details for the verification procedure are included in the Operations Manual
	1.2	yes	AySA will provide: Shapefiles including information on (i) location of eligible area in Florencio Varela and eligible connections, (ii) water quality tests to establish baseline, (iii) information on floodable areas. Details are included in the Operations Manual		HHs must be outside the preidentified fragile areas of the municipality (UREM, RENABAP or ABC). HH connections are completed after loan signature date. The VA will define a representative random sampling size with confidence level 95% and the maximum permissible error (e): 5% and ensure that the connections are working. Distributed water to new connections complies with water quality regulations specified in the OM. Full details for verification are included in the Operations Manual

2 Number of households gaining access to safely managed sanitation services	2.1	yes	AySA will provide shapefile of: (i) Project eligible areas, (ii) fragile neighborhoods database: UREM (including RENABAP) and ABC to verify HH connection eligibility, (iii) data to certify that the wastewater treatment plant complies with regulatory effluent standard, (iii) information on floodable areas. Details included in the Operations Manual.		HHs must be within the preidentified fragile areas of the municipality (UREM, RENABAP or ABC). HH connections are completed after loan signature date. The VA will define a representative random sampling size with confidence level 95% and the maximum permissible error (e): 5%, and ensure that the connections are working. The WWTPs comply with effluent discharge regulations. Full details for verification are included in the Operations Manual.
	2.2	yes	AySA will provide shapefile of: (i) Project eligible areas, (ii) fragile neighborhoods database: UREM (including RENABAP) and ABC to verify HH connection eligibility, (iii) data to certify that the wastewater treatment plant complies with regulatory effluent standard. (iii) information on floodable areas. Details included in the Operations Manual.		HHs must be outside the preidentified fragile areas of the municipality (UREM, RENABAP or ABC). HH connections are completed after loan signature date. The VA will define a representative random sampling size with confidence level 95% and the maximum permissible error (e): 5%, and ensure that the connections are working. The WWTPs comply with effluent discharge regulations. Full details for verification are included in the Operations Manual.
3. Preparation of AySA's Efficiency Improvement Action Plan (EIAP)		NO	AySA will provide the EIAP, copy of all the documentation that is cited in the planning document cited by AySA (particularly other plans, directives, regulations, sources of technical data, budget data), as well as the evidence that demonstrates the official adoption of the EIAP.	TBD	The VA will verify the EIAP contents and that it complies with all of the following conditions for disbursement: i) an in-depth diagnostic taking into account the technical, economic, cultural, social, legal and environmental restrictions impacting AySA's performance ii) a clear and precise identification of initiatives and actions contributing to improving operating costs coverage with internally-generated funds or to reducing operating costs per functional unit (in both cases, as demonstrated by a "with and without project" comparison) iii) the prioritization of initiatives and actions, by weighting the contribution of each of them to the above-mentioned operating costs-related objectives iv) a feasibility-level definition of the selected initiatives and actions, in the case of works, and an analysis of alternatives in the cases of "soft" actions, the replacement of equipment or other situations not requiring a feasibility study v) a study to improve the general collection rate (both current billing and past-due revenue)
4 Implementation of AySA's Efficiency Improvement Action Plan (EIAP).	Sub-DLI 4.1 KPI Increase in Operational Efficiency	yes	For factor "A", NRW, AySA will provide: (i) a shapefile of the intervention area specifying length of the renovated and rehabilitated water networks, (ii) historical data of statistical occurrence of different kind of breakages associated to typical loss rates for each of them to define the average leak in m3/day per repair, (iii) shapefiles that geo-localize the leak intervention with satellite technology and complement sound correlation with its typology and complementary data. For factor "B", energy efficiency: (i) shapefiles that geo-localize all the 800 wells and 146 wastewater pumping where AySA will install Energy Monitoring Equipment, (ii) baseline of energy consumption and water production of each of the 800 wells and the 146 sewage pumping stations, including pump station		For factor "A", NRW, the VA will measure in m3/day the water saving resulting from: a) the rehabilitation of pipes, b) water leak repair using satellite information from pilot studies linking "length of pipes replaced" with "volume of water saved". Works in both areas (renovation pipes and leak repair by satellite detection) will be randomly verified in the field using Kobo Toolbox.  For factor "B", energy efficiency, the VA will measure in kwh / day that results from the savings due to: a) The Distributed Consumption Monitoring Plan, b) The Rehabilitation of the Saavedra water pumping station, c) Distributed self-generation of energy – 200 kW ; and d) The remodeling of the raw water pumping station of the San Martín WTP. The kWh / day saved will be measured by the difference between a baseline energy consumption before the intervention and the energy consumption after the intervention through readings in energy meters. The VA will define a representative

			<p>Saavedra and “Old Pump Station” in water treatment San Martin, (iii) monthly data on energy consumption (kWh) in such locations (iv) Location and monthly data on energy production (kWh) from renewable energy. Details included in the Operations Manual</p>		<p>random sampling size with confidence level 95% and the maximum permissible error (e): 5%.</p> <p>The VA will verify the amount of savings in US\$, using the following equation:  <math>c1 * A [m3/day] + c2 * B [kWh/day]</math></p> <p>Full verification details are included in the Operations Manual.</p>
	Sub-DLI 4.2 KPI on Increase in	yes	<p>AySA will provide a monthly amount and the number of transactions carried out by each of the following payment channels: 1. Banks and Non-Bank Entities 2. Automatic Debit 3. AySA offices 4. Networks, Internet and Online Payment 5. Phone-payment and Pagophone 6. Interdepositos Fiscales</p>	TBD	<p>The VA will calculate the percentage of digital payment by adding the percentage of payments done with: automatic debit, internet or online payment, and phone payment. Achievement is determined according to the percentage increase with respect to the maximum value of the indicator achieved in previous verification cycles. Full verification details are included in the Operations Manual</p>
5. Implement and Strengthen of AySA's PPE	Sub-DLI 5.1 COVID-19	No	<p>AySA will provide evidence on the implementation of the 7 measures contained in the Covid-19 package.</p>	TBD	<p>The VA will verify on the implementation of the 7 measures as per the details included in the Operations Manual</p>
	Sub-DLI 5.2 Lessons learned, contingency plan and seminars	No	<p>AySA will provide the Epidemiological risk contingency plan and related documentation as per details included in the Operations Manual</p>	TBD	<p>The VA will verify that: i) the lessons learned document covers the main issues that affected each relevant area of the service provider, with the corresponding analysis and conclusions; ii) the contingency plan includes, at least, the minimum content listed Operations Manual and iii) the international seminar fulfilled the pursued objective of disseminating experiences of several institutions dealing with the COVID-19 emergency and that AySA shared its progress developing molecular biology technics to identify pathogens in wastewater. Details are included in the Operations Manual</p>
6. Implementation of Digital Solutions	Sub-DLI 6.1	Yes	<p>AySA will provide technical documentation on the 5 activities associated with the digital solutions</p>	TBD	<p>The VA will verify the implementation of the five actions, according to details included in the Operations Manual</p>
	Sub-DLI 6.2 Digital Strategy for Citizen Engagement	Yes	<p>AySA will provide technical documentation on the 5 stages of the digital strategy for citizen engagement</p>		<p>The VA must verify that in a gradual implementation process AySA carries out the following 5 stages, yearly. For stages 1,2 and 3, respectively:</p> <ol style="list-style-type: none"> <li>1. New digital channel for contact with the community (mobile app) that includes typified PQRS and also the possibility of conducting open consultations. Target achieved when mobile app, including predefined functionalities is launched and operational. (Yes / No)</li> <li>2. Integrated Customer Relationship Management (CRM) system. Target achieved when CRM system, including predefined functionalities is launched and operational. (Yes / No)</li> </ol> <p>PQRS assessment and classification according to frequency and average response times. Target achieved PQRS assessment complied with defined requirements. (Yes / No)</p> <p>For stages 4 and 5, the improvement in response time for the 10 most frequent questions/claims/suggestions is assessed. In stage 4, the target will be achieved when at least a reduction of 15 % in the average response</p>

				time is achieved. Similarly, for stage 5, when at least an accumulated 20 % reduction in the average response time is achieved. Details are included in the Operations Manual.
7. Increase of women's representation in leadership positions in AySA.		Yes	<p>AySA will provide:</p> <p>(i) detailed report of the company's payroll in the eligible leadership positions (Directors, Managers and Chiefs), identifying for each position: the functional title, organizational dependency, identification of the gender of the person in charge, and seniority in said position.</p> <p>(ii) Administrative evidence that support the existence of each of the dependencies identified in the detailed report.</p>	<p>The VA will verify that the identified female personnel is in one of the three eligible leadership positions (Director, Managers and Chiefs), according to AySA's organizational structural and by the positions, missions and functions, and will calculate the percentage of women among all workers at those levels.</p> <p>The verification process will be done based on the yearly assessment (12 previous months to the verification).</p>

184. The draft verification reports will be submitted for review by the VA simultaneously to the PCU/GoA and the Bank, and neither party will be allowed to modify such reports, except in the case of factual errors. The Bank will also review compliance with the DLI targets during implementation support missions, and for disbursement purposes, the Bank will make the final decision on whether DLIs have been achieved, as per BP 9.00.

**PART D – PROGRAM ECONOMIC EVALUATION**

**Background**

185. Capital expenditures in water and sanitation by the National Government of Argentina represented 0.13 percent of GDP over the 2017-2019 period, and expenditures are expected to increase to 0.30 percent in 2020. AySA has the largest share of water and sanitation investments in Argentina with 0.08 percent of the GDP over 2017-2019. In 2020, investments by AySA are also expected to increase and reach 0.19 percent, 75 percent of which had already been executed by September 2020. To achieve SDGs 6.1 and 6.2 by 2030, it is estimated that Argentina needs to expand its annual rate of investment in water and sanitation by 2.7 times, increasing the rate of expansion of by 2.6 times for water networks and 4.8 times for sewerage networks.

186. The Program aims at supporting a sustainable path to more efficient operations at AySA. First, with respect to the levels of water losses, AySA is implementing an asset management strategy to prioritize rehabilitation works and to lower technical losses with network renewal and loss reduction targets explicitly mentioned in the PMOEM 2019-23. Second, with respect to metering levels, AySA aims to increase metering significantly by 72 percent between 2019 and 2023, which will result in a total of 875,000 meters installed by 2023. To take advantage of the potential efficiency benefits of metering, AySA has recently changed the tariff structure applicable to metered connections by reducing the fixed charge and increasing the share that corresponds to metered consumption.<sup>76</sup>

<sup>76</sup> AySA (2018) Plan De Mejoras, Operación, Expansión y Mantenimiento De Los Servicios 2019-2023. Revisión Quinquenal.

187. The economic and financial analysis focused on eight specific projects that represent 91 percent of investments in this Program. While the Program includes investments of US\$389 million (without Value Added Tax, VAT), the quantitative economic and financial analysis considered investments that total US\$ 355 million. The benefits of the remaining projects are considered qualitatively. The analysis for each project considers all capital and operating costs required to achieve the objectives. The Net Present Value (NPV) is calculated with a discount rate of 6 percent and with a 30-year horizon.

Table 29: Program Investments Considered in the Financial and Economic Analysis

Projects	Investments (Constant Prices without VAT)		
	Total (US\$ thousands)	Unit Costs (US\$)	Unit
Intrahousehold Water Connections	3,011	75	Person
Intrahousehold Sewerage Connections	21,538	269	Person
South System to Florencio Varela	47,000	551	Person
North Plant	157,000	432*	Person
Jagüel Plant	46,000	319*	Person
Renovation of Water Networks	69,700	1.66	m <sup>3</sup>
Saavedra Pumping Station	7,600	2.07	m <sup>3</sup>
San Martín Plant	3,000	2.13	kWh
<b>Total for Selected Projects</b>	<b>354,849</b>	<b>n/a</b>	<b>n/a</b>
<b>Total for Program</b>	<b>389,136</b>	<b>n/a</b>	<b>n/a</b>

\* Alternative estimations for the Norte and Jagüel WWTPs result in investments of US\$768 per capita (estimated by IADB) and in US\$1340 per capita [estimated by the World Bank (2018)], which are based on different assumptions on total and sunk costs.

### Economic analysis

188. The economic NPV of the Program is positive (US\$1.4 billion) with an Economic Internal Rate of Return (EIRR) of 40 percent. In the economic analysis, costs were estimated with economic prices, i.e. market prices adjusted with shadow price coefficients. Operating costs of the project were estimated by AySA and were adjusted to consider the maintenance requirements over the analysis horizon, in consultation with AySA. The evolution over time of investments, number of beneficiaries, and other benefits over time, together with the methodologies used to quantify them are shown in Table 30.

Table 30: Results of the Economic Analysis.

Project	Economic Analysis			Method for Assessing Benefits
	EIRR	NPV <i>US\$ Thousands</i>	Benefit-Cost Ratio	
Intrahousehold Water Connections	393%	123,067	23.37	CA and SUR
Intrahousehold Sewerage Connections	100%	208,907	10.22	HP
South System to Florencio Varela	18%	68,463	3.00	CA
Norte WWTP	41%	778,086	5.77	HP
Jagüel WWTP	55%	227,813	7.22	HP
Reduction in water losses	10%	26,668	n/a	CS
Saavedra Pumping Station + San Martín WTP	7%	888	n/a	CS
<b>Total</b>	<b>40%</b>	<b>1,433,892</b>	<b>n/a</b>	

Method: 1) CA and SUR: Costs avoided plus consumer surplus based on non-parametric demand, 2) HP: Hedonic prices and propensity score matching; 3) CA: costs avoided<sup>77</sup>; 4) CS: Cost savings. Although in the case of the Plants they were also evaluated through the Willingness to Pay, in these cases lower EIRRs were obtained but always above 6 percent.

189. The projects on intra-household water and sewerage connections has a positive and sizable economic return. The results of 393 percent and 100 percent for the EIRR for these projects can be explained by sunk costs from prior investments in the water and sewerage network. In other words, the marginal benefit of connecting additional households is significantly higher than the marginal cost because, other than the intra-household connections, other parts of the water and sanitation systems are already in place. First, the benefits quantified for water connections include avoided costs from purchasing water from other sources, such as bottled water, and the consumer surplus as a result of higher levels of water consumption, which were calculated comparing water consumption patterns of users that are connected and that are not connected to the network. Second, the benefits associated with sewerage intra-household connections was calculated using hedonic prices, i.e., calculating the differential between property values for identical houses, only varying sewerage availability. Lastly, by improving water quality, the benefits to Florencio Varela are also significant because they target densely populated areas. In addition, the beneficiary areas low income compared to AySA's area of coverage, and these users, relative to their income, place a higher value on receiving service.<sup>78</sup>

190. The assessment of sewerage projects (Norte and Jagüel WWTPs) also revealed a positive and significant economic return under alternative scenarios. The benefits were determined using hedonic prices based on the differential between property values for identical houses, varying access to sewerage. In these projects, the costs of the residential connections were included in the total costs. In all cases, only the benefits accrued to the direct beneficiaries were considered, while other external benefits, for

<sup>77</sup> CA and SUR: Costs avoided plus consumer surplus based on non-parametric demand, estimated by the World Bank Group for Argentina based on data from Argentina's National Institute of Statistics and Censuses (INDEC), including the 2012 Household Income and Expenditure National Survey, the 2010 Census, and the Continuing Survey of Households from 2010 to 2018. HP: Hedonic prices and propensity score matching, using a database constructed by the World Bank Group for Argentina with property values according to their characteristics with source data from INDEC.

<sup>78</sup> Same sources as previously but considering benefits in terms of per capita income, differentiated by quintile.

example, those perceived by neighbors and those indirect benefits such as savings in the cost of public health were not.

191. The economic analysis for projects that seek to reduce NRW resulted in a positive economic return despite conservative assumptions used for the estimation of benefits. The benefits that were considered include the cost savings from water production, electricity, use of chemicals, and the reduction of maintenance needs based on operational costs projections by AySA. It is reasonable to assume that the cost savings associated with these interventions are higher than estimated due to additional benefits that were not quantified, such as an increase in the useful life of the assets, the costs savings from avoiding reactive maintenance, the reduction of interventions in public roads due to water losses, and the consequences of the overexploitation of aquifers.

192. A sensitivity analysis was carried out considering alternative cost and benefit scenarios for the WWTPs, as well as for alternative shadow prices of carbon emissions. First, with regard to the reduction in GHG emissions originating from the Norte and Jagüel WWTPs from energy efficiency improvements and from NRW cost savings, varying the social cost of emissions between low and high scenarios does not significantly affect the EIRR of the Program which remains with an overall EIRR of 39 percent (Table 31). Second, a sensitivity analysis of the results for the interventions involving WWTPs was carried out with 6 different scenarios with alternative levels of benefits and investments. This considered alternative per capita investment costs (lowest of US\$319 and highest of US\$1,340), including a scenario in which no sunk costs are assumed. Two scenarios with alternative benefit estimations were also considered. The resulting economic rates of return were higher than a 6 percent discount rate in all scenarios and reached 55 percent in the highest return scenario. The scenario with higher investment costs and lowest per capita benefits for the Norte and Jagüel WWTPs had an economic return of 8.1 and 8.5 per cent, respectively.

Table 31: Sensitivity Analysis Using Alternative Shadow Price of Carbon Emissions

US\$ Thousands	Average Price of Carbon			High Price of Carbon			Low Price of Carbon		
	EIRR	NPV	B/C Ratio	EIRR	NPV	B/C Ratio	EIRR	NPV	B/C Ratio
Norte WWTP	41%	778,086	5.77	41%	794,132	5.87	40%	762,039	5.67
Jagüel WWTP	55%	227,813	7.22	56%	232,233	7.34	55%	223,392	7.10
Reduction in water losses	10%	26,668	n/a	11%	27,975	n/a	10%	25,360	n/a
Saavedra Pumping Station + San Martín WTP	7%	888	n/a	7%	1,165	n/a	7%	612	n/a
<b>Total</b>	<b>40%</b>	<b>1,433,892</b>		<b>40%</b>	<b>1,455,943</b>		<b>39%</b>	<b>1,411,841</b>	

Note: GHG emission reductions were estimated for all projects except for intrahousehold connections and the South System to Florencio Varela

193. By focusing on the most significant benefits expected from the Program, a small percentage of the investments were assessed qualitatively due to challenges in quantifying their benefits. These investments will positively impact operational performance, transparency and a better relationship with

users, increasing the perceived value of the company by the suppliers and by the community at large, which will result in additional private and social benefits.

194. An increase in the proportion of bills paid with digital methods is expected to increase total revenue collection and generate social and user benefits. The Program will support an investment of US\$3 million to increase the use of digital payment methods. Roughly 51 percent of AySA's revenue collection currently corresponds to in-person payments, representing more than 13 million annual transactions in banks, non-banks financial institutions and AySA offices. During the COVID-19 pandemic, the fact that most bills are usually paid in-person, affected revenue collection. Improved access to digital payments would have partially offset this impact. Digital payments also imply lower travel and time costs for users and reduce the costs of unwanted late payment fees. It eliminates the risk of carrying cash and the inconvenience of planning payments ahead. Facilitating automatic payment from a bank account is likewise expected to improve the collection ratio.

195. The Program's support to gender equality in AySA is also expected to generate significant benefits. These benefits are however challenging to quantify in a cost-benefit analysis. Gender diversity allows greater innovation, better decision-making and governance, increased customer satisfaction and service quality, better employee retention, greater sustainability, operational security and community relations. The social impact of these benefits is considerable, and it can be noted that companies with greater diversity have a 21 percent greater probability of being more profitable and 27 percent greater in creating value.<sup>79</sup>

196. In addition to the economic benefits highlighted, as the economy enters an unprecedented crisis caused by the COVID-19 pandemic, investment in this Program has a high potential to support jobs. In the short term, given that construction works are expected to begin as early as 2021, this Project can support job creation during the economic recovery period. A World Bank analysis of job generation potential of alternative infrastructure investments reveals that WSS projects in Argentina can support between 1,088 and 2,687 direct job-years per US\$100 million invested in activities such as water network expansion and primary and secondary sewerage lines. Based on this estimate, the projects of this Program can support a total of 6,102 to 15,070 job-years, after accounting for direct and indirect jobs, *i.e.* indirect jobs are supported within the suppliers to the production process. In addition, about 75 percent of jobs in WSS construction require low- and semi-skilled workers, which are likely to be filled by low-income workers. To support the jobs agenda, AySA implements the A+T and C+T programs which seek to create new jobs through cooperatives. The cooperatives are associations of autonomous workers that provide the labor force for the execution of projects and receive compensation according to the degree of completion. The Programs also offer training and tools for workers. The works associated with expanding intrahousehold water connections of the Program will be implemented through cooperatives.

### **Financial analysis**

197. An assessment of AySA's financial sustainability and an estimation of the financial impact of the Program was conducted. This analysis involved a review of recent audited financial statements and AySA's financial projections over 2020-2025. While the economic analysis evaluated the Program from a social

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<sup>79</sup> World Bank. 2019. Women in Water Utilities, Breaking Barriers

point of view, considering benefits to users and externalities, the financial analysis focused only on AySA's financial perspective.<sup>80</sup>

198. In 2020, AySA's capital costs represented 46 percent of its total costs, and financial projections show that investment will increase significantly over the next few years (Figure 3). This expected growth in investment shows the Government of Argentina's commitment to pursue the goal of universal access to water and to achieving 75 percent coverage in access to sewerage by 2030. The 2021 National Budget shows that the Government will continue to provide support to cover AySA's operational costs that are funded with tariff revenues, while increasing investment levels. AySA projects an increase in investment from \$401 million in 2020 to \$1.16 billion in 2021, reaching \$1.5 billion in 2025, of which 69 percent will be dedicated to network expansion and 31 percent to improvement and renovation. A focus on investment, especially by expanding assets into poor communities that are hard to reach, can be a more progressive use of resources than supplying subsidies to cover operating costs. Often populations without access to water services are low-income and the expansion of service coverage can generate benefits to newly connected households.

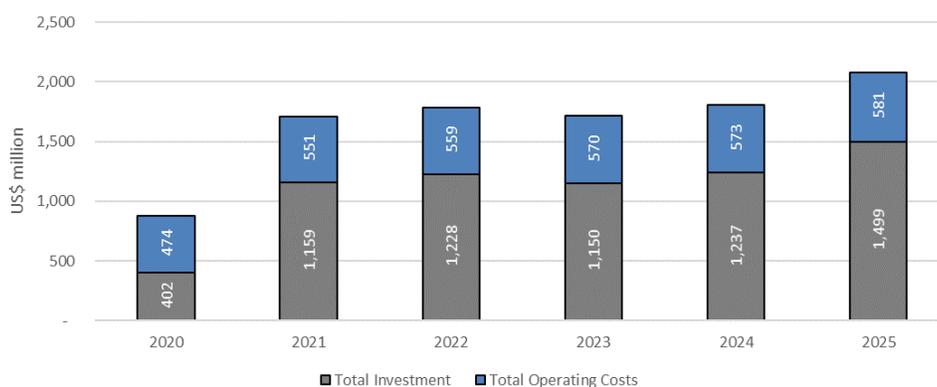


Figure 3: AySA Projections for Operating Costs and Total Investment, Constant 2020 Prices. Note: Original projections in Argentine Pesos converted to US\$ at the rate of \$83.54. Source: AySA Proyección 2021-2025.

199. Following an upward trend in the cost recovery ratio over 2015-2019, in 2019 AySA covered 75 percent of operational costs with tariff revenue, and the remaining 25 percent were covered with transfers from the National Government. The share of operating revenues to operating costs continuously increased from 41 percent in 2015 to 75 percent in 2017, as a result of tariff increases above inflation rates. In 2018 and 2019 cost recovery levels stood at 72 percent and 75 percent respectively (Figure 4). Financial transfers from the Government of Argentina cover the O&M costs that are not funded with tariff revenue.<sup>81</sup>

200. AySA's subsidy scheme is progressive, and includes targeted subsidies, cross-subsidies and supply-side subsidies, as well as subsidies for network expansion. First, the National Government subsidizes capital costs, which are mainly investments to expand water and sanitation services to low-income areas.

<sup>80</sup> The financial analysis used market prices, regardless if that prices represent the true cost to society.

<sup>81</sup> US\$ 121.9 million related to Source 11, US\$ 137.7 million to Source 22 and US\$ 0.6 million from other sources, based on a conversion rate of \$83.54.

Subsidies for network expansion are highly progressive since the main beneficiaries are low-income households, which are the largest proportion of users without access. Second, the subsidies that cover AySA’s operating deficit benefits all users, but it is progressive in relative terms (the poorest 20 percent, while having only 3.6 percent of total income, receive 4.7 percent of subsidies). Third, the tariff structure is based on a cross-subsidy scheme, with the tariff varying according to location, area, quality and age of the property that is being served, which is used as a proxy for the income level of users. Finally, there are targeted subsidies whose beneficiaries are determined based on income and are largely progressive because they benefit directly low-income households.

201. AySA’s financial projections for the period 2021-2025 show a commitment from the GoA to subsidize the financial deficit in the short run, with a view of reducing the operational subsidy over the medium term by reducing supply-side subsidies. In 2020 and 2021, with no expected increase in tariffs during the COVID-19 crisis, the cost recovery ratio is expected to decrease from 75 percent in 2019 to 64 percent in 2020 and 2021 (Figure 4). However, the projections show that an increase in tariffs in constant prices is expected for the years 2022-2025 will lead to an increase in operational revenues above operating costs until reaching full cost recovery by year 2025.

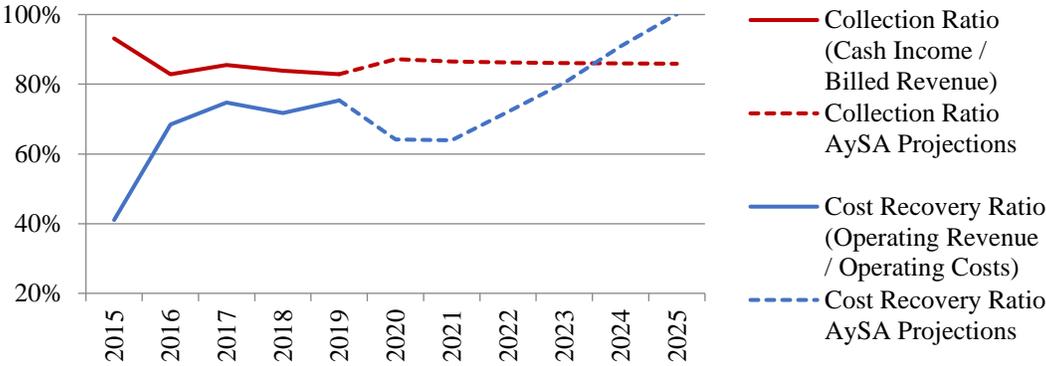


Figure 4: AySA’s Cost Recovery Ratio and Collection Ratio (Realized and Projected), 2015 to 2025. Source: AySA Projection 2021-2025 and AySA Audited Financial Statements

202. During 2020 and 2021, AySA’s financial results will be affected by the COVID-19 pandemic as a result of a decline in revenue collection. In April 2020, a 37 percent year-over-year decline in revenue collection was estimated, after controlling for a change in tariffs from 2019 to 2020. This can be explained not only as a result of the immediate economic impact of COVID-19, but also because of the mandatory lockdown in effect from March 20, 2020, which led to the closure of in-person payment locations, to the limited mobility of individuals due to stay-at-home orders, and to restrictions for AySA to conduct water meter readings<sup>82</sup>. Once GBA lifted some mobility restrictions between May and July 2020, the initial decline in revenue collection was reverted, since users were then able to pay their full balance due in person, leading to a full rebound in revenue collection in the months of May, June and July, 2020. A decline of 10 percent year-over-year in the revenue collection for August 2020. Considering the collection ratio, there was a decrease in the proportion of bills paid by the due date from 68 percent to 63 percent, comparing the months of August in 2020 and in 2019. Moreover, the collection ratio (cash income over

<sup>82</sup> 51 percent of payments were received in AySA’s locations and bank’s branches in 2019.

billed revenue) decreased from 91 percent in 2015 to 84 percent in 2019<sup>83</sup>. It is also important to highlight that as a policy response to the economic crisis, AySA’s suspended service shutoffs for low-income households kept tariffs unchanged.<sup>84</sup>

203. The Government of Argentina will continue to subsidize AySA’s capital investments through transfers, expanding the network to low-income communities and helping ensure a sustainable growth of the water and sanitation network. Figure 5 shows that the government will continue to support the increase in capital costs from AySA and that the O&M subsidies will be phased out in 5 years. Investments from the Program will be executed by AySA and fully subsidized with transfers from the National Government. Benchmarking studies show that AySA is among the majority (86 percent) of water utilities worldwide that do not generate sufficient operating revenue to cover capital and O&M costs, since it is rather unusual for utilities to simultaneously expand services into the hardest places to reach and collect long run marginal costs recovery tariffs from the poor.<sup>85</sup>



Figure 5: AySA’s O&M and Capital Transfers from the National Government (Projected). Note: Original projections in Argentine Pesos converted to US\$ at the rate of \$83.54. Source: AySA Projection 2021-2025

204. The results of the Program’s financial analysis reveal a positive NPV of US\$88.4 million, largely driven by the operational efficiency improvements and the NRW reductions supported by the Program. This analysis takes the latest AySA’s financial statement as a baseline and projects future cashflow, considering the expected change in revenue and costs as a result of the Program’s implementation. It considers operating flows since capital costs are directly subsidized by the National Government through transfers.<sup>86</sup> This financial analysis also calculated the ring-fenced NPV for each individual project. First, the reduced costs associated with the operational efficiency improvements lead to the highest financial NPV

<sup>83</sup> Measured at 90 days past due date.

<sup>84</sup> Water tariffs in 2020 were kept constant in nominal terms despite an annual inflation rate of 42.8 percent (in June 2020) and service shutoffs due to nonpayment were suspended as of March 24, 2020. These temporary measures have been instrumental in protecting vulnerable populations during the pandemic and during the recovery stage, offsetting the impact on low-income households. The Government has announced that they will be effective at least until end-2020.

<sup>85</sup> Andres, L. et al. (2019) Doing More with Less: Smarter Subsidies for Water Supply and Sanitation.

<sup>86</sup> According to the World Bank (2014) IPF Economic Analysis Guidance Note, the financial analysis may include explicit cash subsidies in the financial returns of an agency that operates in commercial terms.

of US\$52.2 million among all project.<sup>87</sup> Second, no financial return is expected for projects associated with network expansion in hard-to-reach low-income communities, which can be explained by the fact that tariffs (with targeted subsidies and cross-subsidies) are relatively low in the areas of intervention. These interventions, however, have the largest economic returns since the network expansions will benefit currently unconnected, low-income and vulnerable households.<sup>88</sup> It is important to highlight that positive financial NPV for the construction of new assets in a poor community when revenues are circumscribed by those users is unusual among water utilities worldwide. Third, the NPV of the South System to Florencio Varela is also largely positive, considering that production from surface water has lower operating costs compared to underground water. The estimations for this project also considered an increase in the collection ratio (Table 32).

Table 32: Results of the Financial Analysis

<b>Projects</b>	<b>NPV</b> (US\$ Thousands)
Intrahousehold Water Connections*	-569
Intrahousehold Sewerage Connections*	-865
South System to Florencio Varela	2,104
Norte WWTP	33,602
Jagüel WWTP*	-5,056
Reduction in water losses	52,176
Saavedra Pumping Station + San Martín WTP	7,030
<b>Total</b>	<b>88,421</b>

Note: Financial analysis based on operating cashflow.

\* Considers the currently subsidized water tariffs (targeted subsidies and cross-subsidies) for low-income households in the estimation of the additional operating revenue from network expansion projects.

<sup>87</sup> This estimation is conservative since it was not possible to quantify the benefits associated with an increase in the useful life of the assets, the costs savings from avoiding reactive maintenance, the reduction of interventions in public roads due to water losses.

<sup>88</sup> The change in cashflow from the project was estimated based on the current tariffs and collection ratio in the areas the project will have an impact on, which are lower than average due to the low-income population served.

## PART E – PROGRAM ACTION PLAN

205. This section includes a series of recommendations to AySA resulting from the current Technical Assessment. The recommendations considered to be most critical are included as inputs to the PAP, which also includes actions recommended as part of the ESSA and Fiduciary Systems Assessment (FSA). The PAP is presented in Table 33.

Table 33: Program Action Plan (at the time of Program Appraisal)

Action Description	DLI	Responsibility	Timing		Completion Measurement
1. Proposal to strengthen PCU for monitoring of program activities and DLIs, ensuring that the PCU has sufficient staff for these tasks, including focal points for each DLI. The proposal should be acceptable to the Bank, prepared and implemented.		AySA	Other	4 months after Effectiveness	Proposal submitted to the Bank and implemented
2. AySA will ensure that no expenses under the Program arise from a contract awarded to a company or individual debarred or suspended by the Bank. (Compliance with the eligibility requirements related to fraud and corruption (according to the Bank's Anti-Corruption Guidelines)).		AySA	Other	Throughout Program Implementation	List of contracts awarded to firms and individuals is sent to the Bank annually.
3. Preparation and implementation of a clause in the bidding documents on the handling of complaints, which includes a detailed description of the procedure through which a timely and fair revision of the complaint is ensured.		AySA	Other	From Effectiveness and during the first 12 months of implementation	Clause on the treatment of procurement-related complaints to be included in the bidding documents, prepared and implemented in a satisfactory manner to the Bank
4. Inform the Bank of F&C allegations. Provide information requested by the WB. Make sure that the persons or contractors who are beneficiaries of World Bank financing know that the Bank may decide to apply sanctions against the person or company in accordance with the Bank's procedures.		AySA	Other	Biannually throughout Program Implementation	Full information, records and documentation the case submitted to the Bank as the Bank may request
5. Map and georeference areas of conservation value within the AySA concession area. Update the map areas with high archaeological and paleontological		AySA	Other	Within the first three months from Effectiveness	1) Publication on the institutional website 2) Incorporation of the information in the EIAs

sensitivity within the AySA concession area.					3) Incorporation in the environmental and social technical specifications (ETAS) update
6. Improve the procedures and processes for the management of materials with asbestos		AySA	Other	Within the first three months from Effectiveness	1) Attach procedure to the ETAs document and incorporate when updated 2) Asbestos management procedure implemented 3) Updated Hygiene & Safety procedures 4) Development of training content and training to the staff provided, with details on training roster
7. Prepare a code of conduct for cooperatives and a model or list of minimum requirements that will be required of the codes presented by contractors. Prepare a model of the beneficiary adhesion and conformity note.		AySA	Other	Within the first three months from Effectiveness, and prior to the start of the Program's works (whichever occurs first)	1) Publication on the institutional website 2) Incorporation into the Environmental and Social Management Plans (ESMPs) 3) Incorporation into the ETAS update
8. Incorporate in the Operations Manual the minimum requirements to be demanded from contractors in the context of an Environmental and Social Management Plan (ESMP) in cases where temporary effects on non-illegal informal economic activities or temporary effects on spaces for community use are identified, based on the measures adopted by AySA up to here in situations of this type.		AySA	Other	Within the first three months from Effectiveness, and prior to the start of the Program's works (whichever occurs first)	Incorporation into the ESMPs

**Recommendations**

*Results Area 1*

206. Potential improvements in the engineering designs for the Jagüel WWTP. Although the design of the Norte WWTP is more advanced, with draft bidding documents already prepared, the World Bank Team considers that there may be opportunities to improve the preliminary design (*anteproyecto*) for the Jagüel WWTP, and alternatives could possibly be identified. Technical assistance in that sense could be mobilized by the World Bank in order to support AySA in further optimizing the design and efficiency of the Jagüel WWTP expansion.

207. Automation and control of aeration in the Norte WWTP. AySA has confirmed that improvements in the automation and control of the Norte WWTP aeration system are being considered under the

WWTP's "Optimization Project", and the World Bank recommends that detailed specifications in that sense be incorporated in the corresponding bidding documents. Such a component offers the potential for considerable OPEX reduction, without compromising effluent quality.

208. Biological nutrient removal (BNR). Upgrading WWTPs to BNR standards tends to drive both CAPEX and OPEX figures up. The World Bank Team recommends that a thorough cost-benefit analysis be conducted to ensure that all alternatives, scenarios and impacts have been identified, allowing AySA to move forward with optimal solutions in the designs of WWTPs.

209. Cogeneration with biogas at WWTPs. It has been established that an increased utilization of biogas for cogeneration purposes would require a significant increase rapidly in electricity prices in Argentina, as observed in neighboring Brazil over the course of the last few years. In addition, there is no current practical experience available within AySA with the design and operation of cogeneration facilities, further impeding taking decisions in favor of cogeneration, which can be perceived as risky. The World Bank Team recommends exploring opportunities to design and conduct pilots to build experience in cogeneration within AySA for when the adequate conditions exist.

210. Flood-prone areas. A number of UREM neighborhoods under the Program contain flood-prone areas which present risks to the health and safety of their residents. Providing intra-HH WSS services in flood-prone areas encourages continued settlement in these high-risk areas if these risks are not mitigated. Therefore, it is recommended that AySA works with the relevant municipal and provincial authorities to mitigate these flood risks in an integrated manner. Interventions could include improved drainage and infiltration, green infrastructure, or flood barriers, and if flood risks cannot be addressed, residents should be resettled out of the flood zone.

211. Updated Communications Plans. During the construction of intra-HH connections, AySA's communications plans should be updated to educate the community about the Program's work on digitalization, including digital payment methods and complaint mechanisms as well as the new mobile application for citizen engagement.

### *Results Area 3*

212. Strategic vision for digital solutions. These actions were presented as ways to solve a specific part of a process or business area, and the World Bank Team recommends to incorporate those actions into a strategic digital plan or masterplan, incorporating not only technical solutions, but reflections on the institutional, organizational and human resources aspects which also need to evolve in parallel in this transition towards digitalization.

213. Citizen Engagement. In order to guarantee that the digital strategy facilitates citizen participation and establishes real digital links with the community, the following recommendations are given as a reinforcement message, as they are aligned with the design that AySA is already considering for this strategy:

- a. Provide relevant information in response to the needs and requirements of each type of user: (i) for general app users: i.e. general information of the company, importance of WSS, progress of

expansion works, interventions and repairs of the networks, WASH campaigns; (ii) for the utility's clients: i.e. commercial data, virtual payment options, virtual office, submission of PQRS.

- b. Enable the possibility of sending photos and georeferencing enabling returns by the operator beyond telephone, which today measures 95% of the contacts with the user's claims.
- c. Once the CRM has been developed and implemented, linking all interactions to the company's existing management information systems (MIS) to streamline response processes.
- d. Ensure that information generated is of real interest to the user, such as pressure data, leaks, works or interventions on public roads projected, disaggregated and georeferenced within the possibilities.