NT.F-0016-2021

FINAL TECHNICAL NOTE

CALCULATION OF THE MAXIMUM AVERAGE TARIFF (P0) AND X FACTOR OF SABESP'S 3rd ORDINARY TARIFF REVISION

April 2021

FINAL TECHNICAL NOTE
SABESP'S 3rd ORDINARY TARIFF REVISION
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1. INTRODUCTION

The purpose of this Technical Note is to present the calculation of the Maximum Average Tariff (P0) produced by Arsesp in the 3rd Ordinary Tariff Revision (3rd OTR) of Companhia de Saneamento Básico do Estado de São Paulo – Sabesp.

Article 38 of Law 11,445/2007, which defines the Brazilian basic sanitation guidelines, provides that tariff revisions must include the revaluation of conditions to render services and applicable tariffs, and may be periodic ordinary revisions or extraordinary revisions. The purpose of the periodic ordinary revisions is the distribution of productivity gains with users and the revaluation of market conditions (item I, article 38).

The regulatory entity is also responsible for issuing regulations related to the regime, structure and tariff levels, as well as for the procedures and terms to define, adjust and revise them (article 23, item IV). The regulatory entity defines the agenda of the ordinary revision by hearing holders, users and services providers (article 38, paragraph 1).

Articles 10, item IV, and 11 of State Complementary Law 1,025/2007 attribute Arsesp the responsibility to regulate and inspect basic sanitation services, including matters concerning tariffs, held by the state and in municipalities who delegated this service to the State, preserving municipal responsibilities and prerogatives.

The proposed methodology for the 3rd OTR was presented by Arsesp in the Preliminary Technical Note NT.F-0029-2020, submitted for public consultation from May 15, 2020 to July 3, 2020, and presented in a public hearing on June 26, 2020. All contributions were analyzed by the Agency and the answers, properly justified, are part of detailed report RC.F-0005-2020. The final methodology, approved and adopted for this tariff cycle (2021-2024), is part of Technical Note NT.F-0043-2020, which describes all the aspects and components necessary to determine the P0 of the 3rd OTR. Based on the evaluation of data received over the process, some elements of the methodology had to be adapted or adjusted – and these cases will be mentioned throughout this technical note.

Arsesp conducted Public Consultation 03/2021 from February 9, 2021 to March 8, 2021, to receive contributions on the Proposal for Calculation of the Maximum Average Tariff (P0) and X Factor of Sabesp's 3rd Ordinary Tariff Revision, which is detailed in the Preliminary Technical Note NT.F-0005-2021, available on Arsesp's website. The calculation proposal was also presented on Public Hearing 01/2021, held on February 25, 2021.

The contributions received were responded in a detailed report, and those partially or totally accepted are part of this Final Technical Note, which include the new calculation of the Maximum Average Tariff (P0) and the X Factor.

In order to facilitate the understanding of the calculations made and data used, the Agency will provide, together with this Technical Note, the economic-financial model created for this 3rd OTR. The entire material will be made available on the website of Arsesp (www.arsesp.sp.gov.br).

2. REGULATORY MODEL OF THE THIRD ORDINARY TARIFF REVISION

The methodology adopted by Arsesp is based on a Discounted Cash Flow model, whose objective is to calculate the maximum average tariff (P0), and uses as references the operating costs, remuneration and recovery of investments and other costs, expected market, where the Net Present Value (NPV) of the tariff cycle is equal to zero, taking into consideration a remuneration rate equal to the Weighted Average Cost of Capital (WACC). The details of the methodology are described in Technical Note NT.F-0043-2020, already disclosed. The calculations presented in this document were based on the afore-mentioned technical note.

In summary, the monetary elements of the cash flow are estimated at constant prices for the entire cycle, which avoids any need for inflation projections. Cash flow is calculated in terms of calendar years and adjustments to the base date are made only in inflationary terms.

During the tariff cycle, the value of the tariffs is adjusted on an annual basis by the accumulated inflation index (IPCA) discounted by a productivity factor, the X Factor, in the Annual Tariff Adjustment (ATA) processes. The General Quality Index (GQI) values will also be monitored and discounted from or added to the IPCA.

The P0 was calculated at October 2020 prices in the OTR and should be adjusted based on the IPCA for the application date. The main information base used for the calculation of the cycle's tariff is the Business Plan (BP) presented by Sabesp. In addition, historical information on the evolution of certain components is analyzed and such information is used to define the targets and standards to be achieved in the tariff cycle, as shown in this Technical Note.

3. MARKET PROJECTION

The variables used to carry out market projection include the number of units, number of connections and volumes of water measured and sewage collected. In view of the tariff structure revision, Arsesp no longer presents distinct projections for billed and measured volumes - such adjustment was necessary because of the existence of a minimum consumption component.

The total volume of measured water and sewage is used as the calculation base of direct revenue, when multiplied by the P0 defined in the cash flow, iteratively. The other information, in addition to being used in the calculation of volume, also make up unit cost indicators used to calculate inefficient operating costs. As shown in NT.F-0043-2020, measured volumes are broken down in Residential, Non-Residential and Others.

3.1. Residential Demand

For projection of the measured volume of water and sewage of the Residential segment, evolution assumptions for water and sewage service index, number of households that may be served and average consumption per household were used.

Water and sewage service indexes were projected by Sabesp in its Business Plan and, for being deemed as appropriate by Arsesp, they were used for projection of residential demand. The evaluation of the service indexes shows that in the weighted average for its area of operation, Sabesp complies with the targets presented in its program contracts with the municipalities. Program contracts present individual targets for each municipality, which may undergo periodic inspection by Arsesp. In the event of non-compliance, a disciplinary measure may be initiated.

The table below shows water and sewage service indexes projected for the areas served by Sabesp for 2021-2024.

Table 3.1: Water and Sewage Service Index

Description	Source	Unit	2020	2021	2022	2023	2024
Water Service Index	- Sabesp	%	94.5%	95.6%	96.3%	96.9%	97.3%
Sewage Service Index - Sabesp		%	83.9%	85.3%	86.5%	87.5%	88.6%

Areas that may be served corresponds to regular urban areas and urban areas to be regularized to be served by Sabesp with public water supply and sewage network, mutually defined by the parties (Sabesp and municipal governments) in the program contract. This area may be changed over time due to the expansion of the urbanized and regularized area.

The projection of household that may be served is presented below. Such projection is part of Sabesp's BP, which made the data from existing program contracts compatible SEADE's household projections. In addition to those informed in the BP, households in the municipalities of Mauá, Tejupá and Tapiratiba were included, due to a residential and non-residential volume reconciliation requested by Sabesp in one of the contributions accepted in the public consultation of this tariff revision. To this end, unit data informed by Sabesp were used and applied the service rate percentage already used in the market in order to reach the number of serviceable households in these municipalities, as follows:

Table 3.2: Households that may be served – Water and Sewage

Description	2020	2021	2022	2023	2024
Number of households that may be served - water	12,078,400	12,513,387	12,684,738	12,859,611	13,037,577
Number of households that may be served (water) - Mauá, Tejupá and Tapiratiba	0	156,018	165,345	174,976	181,131
Total number of households that may be served - water	**12,078,400**	**12,669,405**	**12,850,083**	**13,034,587**	**13,218,708**
Number of households that may be served - sewage	11,938,200	12,169,982	12,335,624	12,504,634	12,679,671
Number of households that may be served (sewage) - Mauá, Tejupá and Tapiratiba	0	6,382	6,407	6,440	6,607
Total number of households that may be served - sewage	**11,938,200**	**12,176,364**	**12,342,031**	**12,511,074**	**12,686,278**

Source: Sabesp. Prepared by: Arsesp.

The service index/household that may be served ratio allows projecting the number of water and sewage household units. These values must be multiplied by average water consumption and average generation of sewage.

Sabesp presented a constant projection for the average water consumption from 2021-2024, of 11 m³/ month/unit. Regarding to sewage, Sabesp's projection of average unit generation is 11 m³/unit/month for 2021, 2023 and 2024, and 10.9 m³/unit/month for 2022.

Considering that Sabesp projected unit consumption near to the realized historic amount, the projections presented by Sabesp were consistent with the historical value.

Accordingly, the projection base used by Arsesp corresponds to the unit consumption and trajectory presented by Sabesp in its BP, taking into consideration that market may change over the cycle, which represents a company risk up to the limits defined in Sabesp's risk matrix[1]. Taking into consideration that, in addition to the application of a new P0, this cycle will have a new tariff structure, Arsesp defined a transition plan that includes a detailed monitoring of the actual market evolution and the way it will affect the company's revenue.

[1] Sabesp's risk matrix, considering the aspects of Arsesp's discretionary regulation rather than the specificities of the program contracts, was presented in NT.F-0003-2018. Arsesp has been developing a specific study to detail such matrix and determine significant variation values that may lead to adjustments to projections over the tariff cycle.

Table 3.3: Monthly Average Consumption of Water and Sewage Units

Residential	Source	Unit	2021	2022	2023	2024
Water	Sabesp	(m³/month/unit)	11.0	11.0	11.0	11.0
Sewage	Sabesp	(m³/month/unit)	11.0	10.9	11.0	11.0

Based on the result of residential units and average consumption, the estimate of residential measured volume is obtained, as per NT.F 0043-2020. The volume projected by Arsesp is nearly 2.0% higher than that projected by Sabesp in its Business Plan for water and 1.0% higher than that projected for sewage – although all the assumptions were accepted, the BP presents a different result from that expected by using the projection methodology.

Table 3.4: Water Measured Volume Projections - Sabesp and Arsesp

Description	Source	Unit	2021	2022	2023	2024
Water measured volume - residential	Sabesp	'000 m³	1,568,665,815	1,601,468,948	1,635,085,107	1,666,609,194
Water measured volume - residential	Arsesp	'000 m³	1,598,116,697	1,632,462,795	1,667,676,430	1,700,305,193

Table 3.5: Sewage Measured Volume Projections - Sabesp and Arsesp

Description	Source	Unit	2021	2022	2023	2024
Sewage measured volume - residential	Sabesp	'000 m³	1,355,191,346	1,392,052,207	1,429,259,930	1,466,801,937
Sewage measured volume - residential	Arsesp	'000 m³	1,364,873,748	1,402,023,134	1,439,543,368	1,477,427,239

3.2. Non-residential demand

To project non-residential market, Sabesp used the trend observed in the previous cycle combined with the participation in total connections after defining the residential connections.

Considering that the historical variations observed in the number of non-residential units are more volatile than those of the residential class, and that it is still not possible to measure the final impact on demand arising from macroeconomic instability, Arsesp accepts the projection made by Sabesp for non-residential demand, considering that market variations will be observed and addressed under the context of the new tariff structure and its transition period.

Table 3.6: Non-Residential Water Volume Projections - Sabesp and Arsesp

Description	Source	Unit	2021	2022	2023	2024
Water volume - Non-residential	Sabesp	'000 m³	206,700,383	209,854,240	212,528,467	215,418,763
Water volume - Non-residential	Arsesp	'000 m³	206,699,895	209,854,679	212,528,090	215,418,317

Table 3.7: Non-Residential Sewage Volume Projections - Sabesp and Arsesp

Description	Source	Unit	2021	2022	2023	2024
Sewage volume - nonresidential	Sabesp	'000 m³	203,996,767	206,580,673	209,069,854	212,052,599
Sewage volume - nonresidential	Arsesp	'000 m³	203,996,643	206,580,229	209,070,019	212,052,577

3.3. Permissionaires' demand

For the volume of permissionaires (wholesale sales), Sabesp's reference was the historical volume of permissionaires that continue to be served by the provider, bearing in mind that over the last few years, Sabesp became the provider of sanitation services to some of the municipalities that were served at the wholesale level.

Table 3.8: Permissionaires' Volume Projections

Permissionaires	Source	Unit	2021	2022	2023	2024
Water	Sabesp	'000 m³	34,666	34,666	34,666	34,666
Sewage	Sabesp	'000 m³	14,169	14,235	14,302	14,370

3.4. Water truck and Sewer truck

Water truck and sewer truck are services provided by Sabesp by means of tank trucks. These services may be constant or occasional, so that the projection of related volumes is significantly complex. Arsesp determined that such volumes make up the company's direct revenue and, therefore, must be added to the calculation of the total volume to be used in the cash flow.

Sabesp informed the history and projection of such volumes, which were accepted by Arsesp, given that they are constant. Accordingly, for the 2021-2024 cycle, water truck and sewer truck volumes will be 5,150 m³/year and 13,276 m³/year, respectively.

3.5. Total Market Projection

Total water demand and sewage generation for the next tariff cycle are obtained based on consumption projections of each category (residential, non-residential, permissionaires, tank trucks).

The tables below show the values projected by Sabesp and the values adjusted by Arsesp for all market variables.

In Sabesp's new tariff structure tariffs will be charged for three services: water, sewage collection and sewage treatment. Only water and sewage collection are currently subject to pricing. Accordingly, the volume of treated sewage should be included in the calculation base of P0.

There will be a transaction period over the next cycle, where the tariff structure will be gradually implemented. Considering that the volume of treated sewage and the related revenue have lower weight compared to the other items; there is a significant uncertainty towards its projection; and, especially, there is a proposal to implement a mechanism to limit revenue risk for both users and the company over the next cycle (so that, in the event of additional revenue arising from sewage treatment pricing, it will be reintegrated in favor of users as a compensatory adjustment over the cycle), Arsesp decided to maintain the cash flow of the 3rd OTR without considering treated volume as a market variable. However, as from the next OTR, it should be part of total market volume to be considered in the flow.

Volumes related to sewer truck are not incorporated in sewage collection, only in treated volume.

Table 3.9: Comparison between the projection of water market variables - Arsesp and Sabesp

Description	Source	Unit	2021	2022	2023	2024
Sabesp's Projection						
Water volume - Residential and Non-Residential	Sabesp	'000 m³	1,775,366	1,811,324	1,847,613	1,882,082
Permissionaires' water volume	Sabesp	'000 m³	34,666	34,666	34,666	34,666
Tank truck volume	Sabesp	'000 m³	5	5	5	5
Total Volume	**Sabesp**	**'000 m³**	1,810,037	1,845,995	1,882,284	1,916,753
Arsesp's Projection						
Water volume - Residential and Non-Residential	Arsesp	'000 m³	1,804,817	1,842,317	1,880,205	1,915,724
Permissionaires' water volume	Arsesp	'000 m³	34,666	34,666	34,666	34,666
Tank truck volume	Arsesp	'000 m³	5	5	5	5
Total Volume	**Arsesp**	**'000 m³**	1,839,488	1,876,989	1,914,876	1,950,395

Table 3.10: Comparison between the projection of sewage market variables - Arsesp and Sabesp

Description	Source	Unit	2021	2022	2023	2024
Sabesp's Projection						
Sewage volume - Residential and Non-Residential	Sabesp	'000 m³	1,559,188	1,598,632	1,638,330	1,678,855
Permissionaires' sewage volume	Sabesp	'000 m³	14,169	14,235	14,302	14,370
Total Volume	**Sabesp**	**'000 m³**	1,573,357	1,612,867	1,652,632	1,693,225
Arsesp's Projection						
Sewage volume - Residential and Non-Residential	Arsesp	'000 m³	1,568,870	1,608,603	1,648,613	1,689,480
Permissionaires' sewage volume	Arsesp	'000 m³	14,169	14,235	14,302	14,370
Total Volume	**Arsesp**	**'000 m³**	**1,583,039**	**1,622,838**	**1,662,915**	**1,703,850**

4. WATER SUPPLY AND SEWAGE TREATMENT PROJECTION

In order to calculate the volume of water to be produced, in addition to the volume necessary to meet the projected water demand, it is necessary to include the volume corresponding to the losses occurring throughout the distribution process - such volume, in terms of tariff calculation, must be based on water supply systems that meet efficiency standards in order to achieve and maintain loss levels within limits that are acceptable from a regulatory point of view. In addition to the water losses, the volume produced must include the volumes reserved for so-called special activities, which correspond to the social, emergency, operating and own uses.

4.1. Water Losses

The tariff regime used defines a maximum price mechanism based on efficient company costs projected for the tariff cycle. The control of water losses has a direct impact on production costs, since greater losses require greater water production, which influences the consumption of electricity and chemical products, among others factors that have a strong participation in the cost structure. It also has an impact on revenue, resulting from the apparent or commercial losses from under-measurement of consumption, for example.

The recognition of these costs implies establishing an efficient loss level, which Arsesp calls “Regulatory Losses”.

The agency understands that loss trajectory must be signaled for the medium and long terms, allowing the provider a chance to overcome the target. It is important to clarify that the regulatory loss target is defined to project efficient costs for the cycle and the contractual targets agreed upon with the municipalities cannot be confused or replaced. From a tariff standpoint, maintaining loss levels that are higher than those established in the OTR implies additional operating costs for producing such volume of water, which will not be recognized in the tariff.

Arsesp, through action DS-2 of the 2020/2021 Regulatory Agenda, studied the matter above to address the trajectory of efficient losses to be used in Sabesp’s 3rd OTR. Public Consultation 11/2020, carried out from October 2, 2020 to October 19, 2020, resulted in NT.F-0064-2020, which defines the trajectory of losses over the cycle.

Table 4.1: Index of Regulatory Losses

Description	Source	Unit	2021	2022	2023	2024
Loss index	Arsesp	L/con./day	252.8	247.4	242.0	236.6

Source: Arsesp (NT.F 0064-2020).

In its Business Plan, Sabesp presented a projection of losses, whose starting point (2020) started at 288/L/con./day, reaching 249/L/con./day at the end of the cycle (2024). However, as explained above, the trajectory of efficient losses over the fourth tariff cycle has already been discussed in public consultation.

It is worth noting that Sabesp guarantees a tariff level that will support operating costs for water production, considering the level of regulatory losses. Above such limit, costs will be supported by Sabesp, not by users.

4.2. Special uses

The volume for special uses corresponds to the amount of water for social, operating, emergency and own use. The amount for social use is related to the estimated volume consumed illegally in irregular communities, which have some form of water supply, but where there is no billing by Sabesp. The volume of water used by the Fire Department is also classified as social use. "Operating use" refers to the volume of water used for washing filters or any activity in the production stage, but it is not included in the loss indicator.

According to the water balance of the International Water Association (IWA), the volume used for operating activities, such as the washing of filters, as well as illegal consumption, is regarded as Unbilled authorized consumption.

In the proposal for the methodology to be adopted in this tariff revision, Arsesp pointed that it would thoroughly evaluate such volumes, in order to obtain a more accurate projection from a regulatory point of view. However, the information provided for such analysis were insufficient. Arsesp will carry out studies related to special use components over the cycle, in order to provide a methodological progress in the next OTR.

Therefore, for this moment, Arsesp maintained the volumes observed in 2020, already including the new municipalities operated by Sabesp.

Table 4.2: Special uses

Description	Source	Unit	2021	2022	2023	2024
Special uses volume	Arsesp	'000 m³	190,220	190,220	190,220	190,220

4.3. Projection of the total volume of water produced

The water production recognized in the definition of the tariff corresponds to the sum of the following volumes:

- Total water demand projected for residential and non-residential users and others;
- Volume for special uses; and
- Regulatory losses.

Accordingly, considering the projection of the measured volume of water approved by Arsesp, the annual loss index and the special use volume, the total volume produced recognized by Arsesp for the next tariff cycle is as follows:

Table 4.3 – Result of Arsesp's projections for the volume produced (2021-2024)

Description	Unit	Source	2021	2022	2023	2024
Loss Index	l/con./day	Arsesp NT.F-0064-2020	252.81	247.42	242.03	236.64
Active water connections	unit	Sabesp	9,195,411	9,392,746	9,584,498	9,748,015
Volume of losses	m³	Arsesp	848,512,518	848,242,881	846,703,634	841,971,153
Distributed volume	m³	Arsesp	1,839,487,742	1,876,988,624	1,914,875,670	1,950,394,660
Volume for special uses.	m³	Arsesp	190,219,622	190,219,622	190,219,622	190,219,622
Volume of water produced	**m³**	**Arsesp**	2,878,219,882	2,915,451,126	2,951,798,926	2,982,585,434

4.4. Projection of treated sewage volume

Another component related to market variables is the volume of treated sewage (see the discussion regarding its incorporation in the total market in the previous section). For this tariff cycle, Arsesp will use the volume of treated sewage only as a driver of treatment costs.

Its projection is based on the collected volume/treatment index ratio based on the evolution of Sabesp's targets. Moreover, sewer truck volumes are included in collected sewage volumes.

See the results in the tale below:

Table 4.4 – Projection for treated sewage volume (2021-2024)

Description	Unit	Source	2021	2022	2023	2024
Treatment Index (collected volume)	%	Sabesp	77.2%	84.6%	85.8%	87.2%
Volume of Sewage Treated	m³	Arsesp	1,568,870,391	1,608,603,363	1,648,613,387	1,689,479,816
Permissionaires' sewage volume	m³	Sabesp	14,169,000	14,235,000	14,302,000	14,370,000
Sewer truck volumes	m³	Sabesp	13,276	13,276	13,276	13,276
Volume of sewage treated	**m³**	**Arsesp**	**1,225,114,887**	**1,374,386,763**	**1,428,363,950**	**1,488,015,151**

In 2020, the value projected by Sabesp for the treatment index was 74.5% (this is a projection, since data for 2020 was incomplete at the moment of presentation of the BP), considering the new operated municipalities.

Projection for the fourth tariff cycle begins with 77.2% in 2021, and reaches 87.2%[2] in 2024.

Considering that, according to the new regulatory framework for sanitation, companies are required to reach a collection and treatment index[3] of 90% by 2033, Sabesp improved and, according to the trend, it will be able to meet with the target. Accordingly, it should be possible to reach 87.2% in 2024. Program contracts present individual targets for each municipality, which may undergo periodic inspection by Arsesp. In the event of non-compliance, a disciplinary measure may be initiated.

In addition, regarding the supply capacity both from the point of view of the installed capacity and water availability of the water sources, Arsesp will operate with Sabesp over the fourth tariff cycle to obtain more detailed and sufficient data to carry out a robust overall analysis.

[2] The rise in the index is consistent with the acceleration of investments in network expansion and sewage treatment at the end of the cycle.
[3] Law 11,445/2007 – Article 11-B

5. OPERATING COSTS AND EXPENSES (OPEX)

5.1. Adjustments for OPEX not recognized

As defined in the methodology, Arsesp made qualitative reversals in expense lines that are not recorded in operating costs because of their nature. The accounts not recorded are as follows.

Table 5.1: Accounting lines not recognized for the making up of regulatory OPEX

Expense Group	Description
Personnel	Bonus - Executive Board
Personnel	Indemnity - incentive
Personnel	Paid sabbatical leave
Personnel	Profit sharing
Personnel	Additional pension benefits - G0
Personnel	Private pension - DB Social Security deficit
Personnel	Award program
Personnel	Knowledge Retention Program
Personnel	Consent Decree - retirees
General supplies	Environment - environmental compensation
Outsourced services	Rentals - Right-of-Use Contracts
Outsourced services	Environment - environmental compensation
Outsourced services	Regular. Environmental Recovery Commitment Term - Services
General expenses	Institutional support
General expenses	PVA Liabilities from Settlements
General expenses	Donations
General expenses	Indemnity to third parties (vehicles)
General expenses	Indemnity from Settlements
General expenses	Indemnities due to environmental damage
General expenses	Labor indemnity
General expenses	Indemnities due to third-party damage
General expenses	Traffic ticket

Expense Group	Description
Personnel	Estimate with personnel expenses
Personnel	PROVISION - FGTS
Personnel	PROVISION - INSS
Personnel	Provision retirement (current)
Personnel	Provision - Vacation bonus
Personnel	Provision - Management's Christmas bonus
Personnel	Provision - Christmas bonus
Personnel	Provision - Vacation
Personnel	Provision - Profit sharing
General supplies	Estimate with supply expenses
Treatment supplies	Estimate with treatment supplies
Outsourced services	Estimate with outsourced services
Electricity	Estimate with electricity expenses
General expenses	Estimate - receipt of water bill
General expenses	Estimate with general expenses
General expenses	Provision for civil contingencies
General expenses	Provision for customer contingencies
General expenses	Provision for supplier contingencies
General expenses	Provision for other civil contingencies
General expenses	Provision for labor contingencies
General expenses	Provision for environmental contingencies
General expenses	Provision for tax contingencies
General expenses	Provision for sundry losses

Source: ARSESP, based on Sabesp's account classification[4].

Note that mainly accounts linked to estimates or provisions have been eliminated. The objective of the qualitative disallowances is to establish the reference operating cost for the calculation of the unit costs, which are used for the operating cost projection. Unit costs should reflect the most efficient ratio to be used as reference in the tariff cycle, ensuring that expenses to be borne by the tariffs paid by users to properly meet the principle of efficiency.

In addition to estimates and provisions, Arsesp also reverses accounts whose expenditures should be borne by the provider, not by users, such as donations and institutional supports (initiatives for the company's institutional strengthening that should be the responsibility of the shareholders, and not the users), fines, indemnities and terms of commitment (resulting from the provider's actions, who are also

[4] It is worth noting that this step will no longer be carried out in the next OTR processes, due to the implementation of the chart of accounts, object of Arsesp's initiative to consolidate the Regulatory Accounting.

liable for risks), in addition to bonus, profit sharing and Voluntary Redundancy Plan.

In the public consultation process, Sabesp requested the revision of the disallowance of some of these accounts. Arsesp had reversed all accounts referring to PEP elements that represent the accounts that, temporarily, include expenses that may be maintained in the operational accounts or transferred to CAPEX as capitalizable expenses. At the time, Arsesp considered that such elements could be duplicated, since it was expected that their final values, maintained as OPEX, had been migrated to the respective accounts. In the public consultation, Sabesp informed that the elements presented corresponded to OPEX values not transferred to the proper accounts. Therefore, the values were incorporated to the model.

Sabesp also requested the inclusion of labor compensation, third-party damage, profit sharing and bonus. Regarding labor compensation, even being recurring and usual in the market, it is a risk to the provider and it would not be appropriate to allocate to users a service-provision risk. Note that being usual does not mean that a specific expense should no longer be a shareholder risk. Including this type of expense in the tariff would necessarily transfer the risk to users, thus changing the company's risk matrix. It should also not be assumed that, by not including such expense as regulatory, it could lead to an increase in personnel expenses, which are regulatory. The model provides for the control of unit costs and its efficiency, so that it would not be possible to recognize the amount of expenses beyond the efficiency levels.

Other indemnities follow the same idea. Even if they are usual, they are not a user risk. It is worth noting that the tariff covers insurance expenses, which may be used to mitigate risks with this type of indemnity. In this sense, there is a tradeoff between the contracting of insurance and the payment of compensation (given that covering all risks could significantly increase the insurance contracting cost). Accordingly, Arsesp will analyze over the cycle methodologies to assess the benefit-cost ratio of insurance and adjust how such elements are addressed in the next OTR.

The previous version of this Technical Note mentioned the disallowance with municipal property tax (IPTU) expenses. Such disallowance had not been realized and was addressed as error.

Considering the expenses of the 2017-2019 period, the reversal equivalent to the exclusion of these accounts was 8.5% in total operating costs, broken down by expense group as follows. Some accounts have a negative value, as they may represent adjustments between accounts (transfer of values). For this reason, some qualitative disallowances may, indeed, increase total OPEX value.

Table 5.2: Percentage of expenses not recorded in the 2017-2019 period

Expense Group	Average Disallowance of the 2017-2019 period
Personnel	-9.3%
General Supplies	-6.2%
Treatment Supplies	-5.3%
Outsourced Services	0.0%
Electricity	0.3%
General Expenses	-46.5%
Total	**-8.5%**

Source: ARSESP.

5.2. Operating cost projection

The projection model of operating costs is based on the definition of unit costs per purpose and production stage, using the drivers presented in the table below.

Table 5.3: Drivers used for the projection of operating costs (OPEX)

WATER SUPPLY SYSTEMS		
PURPOSE	**PRODUCTION**	**DISTRIBUTION**
PERSONNEL	Average compensation (R$/employee)	Average compensation (R$/employee)
	Employees are fixed	Employees are fixed
GENERAL SUPPLIES	Volume of Water Produced	Water Connections
TREATMENT SUPPLIES	Volume of Water Produced	Volume of Water Measured
SERVICES	Volume of Water Produced	Water Connections
ELECTRICITY	Volume of Water Produced	Volume of Water Measured
GENERAL EXPENSES	Volume of Water Produced	Water Connections
SANITARY SEWAGE SYSTEMS		
PURPOSE	**COLLECTION**	**TREATMENT**
PERSONNEL	Average compensation (R$/employee)	Average compensation (R$/employee)
	Employees are fixed	Employees are fixed
GENERAL SUPPLIES	Sewage Connections	Volume of Sewage Treated
TREATMENT SUPPLIES	Volume of Sewage Treated	Volume of Sewage Treated
SERVICES	Sewage Connections	Volume of Sewage Treated
ELECTRICITY	Volume of Sewage Treated	Volume of Sewage Treated
GENERAL EXPENSES	Sewage Connections	Volume of Sewage Treated
COMMERCIAL AND ADMINISTRATIVE SYSTEMS		
PURPOSE	**COMMERCIAL**	**GENERAL MANAGEMENT**
PERSONNEL	Average compensation (R$/employee)	Average compensation (R$/employee)
	Employees are fixed	Employees are fixed
GENERAL SUPPLIES	Water Connections	Fixed
TREATMENT SUPPLIES	Water Connections	Fixed
SERVICES	Water Connections	Fixed
ELECTRICITY	Water Connections	Fixed
GENERAL EXPENSES	Water Connections	Fixed

Source and Preparation: Arsesp.

The drivers used to define operating costs were projected as shown in sections 3 and 4 of this Technical Note. For the general supplies, treatment supplies, outsourced services and general expenses groups, unit costs (OPEX/driver) were set based on the figures of the 2017-2019 period. For electricity, according to contributions received in the public consultation, the unit cost observed in 2019 was maintained, in view of the behavior of electricity prices over the cycle and the expectations of price evolution over the next cycle. It is worth noting that the 2021-2022 Regulatory Agenda includes action DEF-20 that aims at analyzing efficiency metrics for electric power and chemical products expenses of basic sanitation concessionaires.

Note that regarding treatment supplies and electricity, NT.F 0043-2020 showed a specific analysis on the efficiency of these components. However, when analyzing the data, it was observed that such evaluation is quite complex and requires thorough studies. For this reason, the methodology applied to the other items (general supplies, outsourced services and general expenses) was maintained.

Regarding personnel expenses, considering that Sabesp informed in its Business Plan that it will maintain the number of employees throughout the tariff cycle, Arsesp used the average cost per employee in 2019 and multiplied it by the number of employees informed (13,422 employees/year). In addition, Sabesp included a real growth of 2% p.a. in personnel expenses. However, Arsesp, based on the principles of prudence and tariff affordability, as well as a way to induce an efficiency trajectory, included a real growth of 0.5% p.a.

In the outsourced services item, Sabesp requested the inclusion of an additional R$300 million over the cycle, equivalent to R$75 million/year, as no employees were hired over the cycle. Arsesp accepted the above-mentioned proposal. However, it will carry out an economic-financial inspection of such expenses over the cycle, checking whether they comply with the principles of efficiency, prudence and reasonableness.

Additionally, as per NT.F-0043-2020, the unit cost observed in the 2017-2019 period was compared to the unit cost used in the 2nd OTR, in order to ensure that there is no loss off efficiency already considered. That is, the starting unit cost for the fourth tariff cycle is the unit cost used in the 2017-2019 period, compared to the unit cost used in the third tariff cycle, whichever is lower. Accordingly, Arsesp seeks to ensure that the starting point for the fourth cycle has no loss of efficiency when compared with the previous cycle.

After determining unit costs, specific consumption and unit prices, as well as projecting the drivers, the projection of operating costs for the tariff cycle was obtained. In summary, the sequence of calculation is as follows:

a. Calculation of annual disallowance per expense group (Personnel, General Supplies, Treatment Supplies, Outsourced services, Electricity and General Expenses.
b. Projection of costing drivers, as per previous sections;
c. Calculation of unit cost (OPEX/driver) for the General Supplies, Treatment Supplies, Outsourced Services and General Expenses categories in the 2017-2019 period;
d. Calculation of unit prices (OPEX/employees[5]) for the Personnel category;
e. Calculation of the 2019 unit price (OPEX/driver) for the Electricity category;
f. Projection of the General Supplies, Treatment Supplies, Outsourced Services and General Expenses categories maintaining the unit costs for the 2017-2019 period or the unit costs of the 2nd OTR (whichever is lower) constant and using the projections generated in the previous sections for the drivers;
g. Projection of the Energy category, considering the unit cost of 2019 multiplied by the driver.

[5] For the OPEX/employees ratio, the unit cost of the last available year of the cycle (2019) was used.

h. Projection of the Personnel category, considering the unit price of 2019 multiplied by the fixed number of employees in the cycle.

Regarding personnel expenses and electricity, the calculation was carried out in a specific way, considering the particularity of the calculation this cycle.

The adjustments made by Arsesp corresponded to an average decrease of 17.4% in operating costs, compared with the amounts informed by Sabesp in the Business Plan for the 2021-2024 period, as shown in Table 5.4.

Table 5.4: Difference between Arsesp's and Sabesp's projected operating costs

Description	2021	2022	2023	2024	Total of the Cycle
PERSONNEL	11.0%	14.9%	17.6%	20.3%	16.1%
GENERAL SUPPLIES	22.4%	22.4%	22.3%	22.3%	22.3%
TREATMENT SUPPLIES	10.5%	10.7%	10.4%	10.6%	10.5%
OUTSOURCED SERVICES	12.8%	12.9%	12.9%	13.0%	12.9%
ELECTRICITY	4.3%	5.5%	6.6%	8.0%	6.2%
GENERAL EXPENSES	55.1%	55.0%	54.9%	54.8%	54.9%
Total	**15.2%**	**16.8%**	**18.0%**	**19.3%**	**17.4%**

Source: ARSESP.

It is worth noting that the values projected by Arsesp also exclude the values related to credits from Public-Private Partnerships (PPPs), asset leases, expenses with municipal funds and payments for the use of water resources - all these components are addressed in separate components of the economic-financial model.

Table 5.5: Projected values for 2021-2024 OPEX (R$ Oct/20)

Description	2021	2022	2023	2024	Total
Personnel	2,587,141,694	2,600,077,402	2,613,077,789	2,626,143,178	10,426,440,064
General supplies	236,090,549	245,124,124	250,806,514	256,328,862	988,350,050
Treatment supplies	313,783,210	326,796,459	333,477,600	340,106,960	1,314,164,229
Outsourced services	1,576,687,650	1,626,187,592	1,660,308,667	1,693,085,371	6,556,269,280
Additional Outsourced services	75,000,000	75,000,000	75,000,000	75,000,000	300,000,000
Electricity	1,207,248,745	1,245,129,021	1,269,543,709	1,293,218,073	5,015,139,548
General expenses	334,198,378	341,540,934	346,873,903	351,887,920	1,374,501,135
Total	**6,330,150,226**	**6,459,855,532**	**6,549,088,183**	**6,635,770,366**	**25,974,864,307**

Source: ARSESP.

Regarding operating costs, except for personnel expenses, the reduction calculated on the efficiency sharing factor - X Factor - will be used, which is described in a specific section below. The non-inclusion of the personnel item is due to the assumption of maintaining the number of employees, which already introduces efficiency gains in the cycle.

5.3. Credits from Public-Private Partnership and Asset Lease

Credits from Public-Private Partnerships and asset lease are a specific component in the cash flow, which are added to OPEX from each year. The values considered for the 2021-2024 period are described in the table below and were proposed by Sabesp in its BP.

Table 5.6: PPPs' credits and asset lease - R$ Oct/20

Description	2021	2022	2023	2024
Asset Lease	83,597,307	83,597,307	83,597,307	83,597,307
Alto Tietê PPP	142,908,920	143,214,759	143,524,066	34,350,722
São Lourenço PPP	425,041,419	425,041,419	425,041,419	425,041,419
Total	**651,547,646**	**651,853,485**	**652,162,792**	**542,989,448**

Source: SABESP's BP.

No X Factor is applied in this component. Investments made through PPPs and asset lease are not a part of the projected CAPEX nor the Regulatory Remuneration Base. It is worth noting that new PPP agreements must be previously submitted to Arsesp, with a feasibility study and information proving the prudence of the investment and affordability gains related to the adoption of this mechanism. It is also important to consider that these components are subject to compensatory adjustments, considering their real values at the end of the tariff cycle.

5.4. Performance Contracts

According to NT.F-0043-2020, the tariff model for this 3rd RTO will not include a projection for this component since its determination is obviously complex. However, the "bonus" amounts identified during the 4th cycle, which are treated as expenses and not as fixed assets, will be subject to compensatory adjustment upon the 4th OTR.

Please note that, similarly to the PPP, Arsesp will guide the criteria for the final accounting of the performance contract values. As from this cycle, Sabesp must submit the new performance contracts to Arsesp, with a feasibility study and information that allows assessing the affordability

gains and the prudence of this type of contract (advantages compared to own execution), similarly to the PPPs. The submission must include the indication of bonus amounts that are not strictly related to physical assets or expenses usually capitalizable (labor, studies, projects, licenses, among others). Such ratification does not intend to authorize the use of these models, but only previously identify how they will be addressed in terms of tariffs.

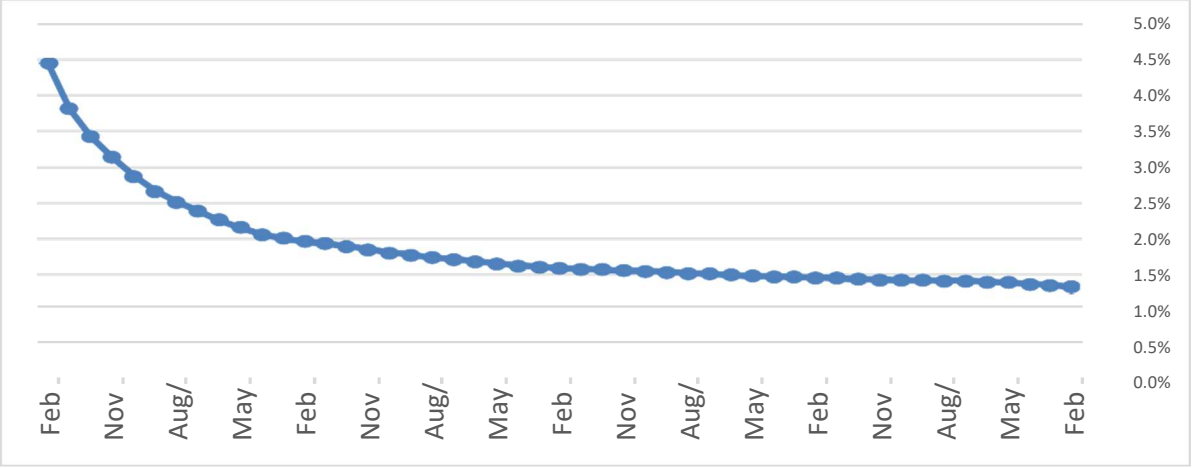
6. OTHER OPERATING COSTS

6.1. Default Costs: Irrecoverable Revenues

As presented in Technical Note NT.F-0043-2020, the regulatory percentage of irrecoverable revenues will be obtained from the debt aging methodology and will not include wholesale default.

In this model, the monthly billing not received by the reference date is compared to the provider's monthly billing in a long series (in this case, a period of 60 months is used), generating a monthly non-receipt index. For the definition of the percentage of irrecoverable revenue to be applied to direct operating revenue, the stabilization point will be taken into account.

Chart 6.1: Default aging (logarithmic scale)



Source: SABESP data. Prepared by: ARSESP.

The analysis of the chart above shows a stabilization of the default level as from 2016. The table below shows the average default percentage per year. The percentage to be considered for the next tariff cycle will be 1.41% of direct revenue. The projected values are shown in table 6.2 below.

Table 6.1: Sabesp's Average Default

Year	%
2020	5.96%
2019	2.50%
2018	1.73%
2017	1.51%
2016	**1.41%**
2015	1.21%

Source: SABESP. Prepared by: ARSESP

Table 6.2: Regulatory irrecoverable revenues - 2021 to 2024 - R$ thousand Oct/2020

Description	2021	2022	2023	2024
Direct Required Revenue	17,328,298,303	17,719,668,444	18,114,401,520	18,501,486,150
% default	1.41%	1.41%	1.41%	1.41%
Irrecoverable Revenues	**244,173,950**	**249,688,767**	**255,250,971**	**260,705,401**

Source and Preparation: ARSESP

6.2. Fund for Municipal Sanitation Expenditures

Article 13 of Federal Law 11,445/2007 authorized the creation of funds with the purpose of financing initiatives capable of ensuring the universalization of basic sanitation utility services, in accordance with municipal sanitation plans. It is, therefore, a public policy instrument with the aim of contributing and reinforcing the funding sources necessary to the universalization initiatives of basic sanitation utility services, namely article 13.

> Federation entities, individually or by means of public consortium, may create funds, to which it may be allocated, among other resources, portions of service revenues, in order to finance, as per the provisions of the respective basic sanitation plans, the universalization of basic sanitation utility services.
>
> Sole Paragraph. The funds referred to in the main section of this article may be used as sources or guarantees in credit operations to finance the investments necessary to the universalization of basic sanitation utility services.

Accordingly, the recognition of this item as cost to the provider is duly provided for in the law that governs the basic sanitation sector.

In urban areas, the search for universalization implies coverage expansion, especially in the suburbs, which are mainly home to low income population and which, because of the complexity of the works, require integrated actions from the holders of public sanitation services with the provider.

In other words, in order to be possible to expand the water supply and sewage systems infrastructure and operating facilities, certain investments and actions are required, which are the responsibility of the municipalities and not directly of the service providers, such as urbanization of informal communities and settlements, land regularization and the channeling of streams, among other initiatives, which are essential for expanding the water and sewage system.

As stated in Technical Note NT.F-0043-2020, the item Fund for Municipal Sanitation Expenditures should indicate a regulatory limit of the transfers made by the Provider to regulated municipal funds, in order to allocate resources to basic sanitation works, as provided for in Law 11,445/07.

The regulatory limit defined by Arsesp corresponds to 4% of the direct operating revenue obtained in the respective municipality where the Fund was created (ARSESP Resolution 870, of May 13, 2019). The lowest between the percentage defined by the municipality and the regulatory limit of 4% will be recognized in the tariff. Amounts higher than the regulatory limit will be exclusive to the municipality.

In order to project this item in the 2021-2024 tariff cycle, the criteria adopted by the Agency was to include in the tariff calculation only the percentage limited to 4% of Sabesp's direct revenue in the municipality, when there is a legal and contractual provision of a fund for basic sanitation works. Moreover, municipalities qualified by March 2021, totaling 25 municipalities (including São Paulo), were taken into consideration.

Table 6.3: Municipalities with FMSAI qualified by ARSESP and included in the tariff

Municipality	2019 Revenue (%)	ARSESP Resolution Qualification
Assis	0.34%	1.013/2020
Bragança Paulista	0.47%	1.049/2020
Guarujá	1.07%	1.050/2020
Guarulhos	3.40%	1.014/2020
Itanhaém	0.42%	1.012/2020
Jandira	0.34%	1.110/2021
Joanópolis	0.03%	1.077/2020
Nazaré Paulista	0.02%	1.024/2020
Paraguaçu Paulista	0.12%	1.030/2020
Pedra Bela	0.01%	1.023/2020
Pedrinhas Paulista	0.01%	1.141/2021
Peruíbe	0.32%	1.035/2020
Pinhalzinho	0.02%	1.025/2020
Piracaia	0.05%	1.094/2020
Pirapora do Bom Jesus	0.04%	1.026/2020
Poá	0.37%	1.062/2020
Praia Grande	1.33%	1.008/2020
Santana de Parnaíba	0.46%	1.032/2020
Santo André	0.91%	1.011/2020
São Bernardo do Campo	3.09%	1.007/2020
São João da Boa Vista	0.31%	1.076/2020
São Paulo	48.88%	870/2019
São Sebastião	0.31%	1.015/2020
São Vicente	0.99%	1.063/2020
Vargem	0.01%	1.016/2020
Total Qualified	**63.31%**	
FMSAI 4%	**2.53%**	

Source and Preparation: ARSESP

As the municipalities create funds that meet the established assumptions during the current cycle, the amounts actually paid by Sabesp will be subject to compensatory adjustment in the next tariff cycle, always limited to 4% of the direct operating revenue of each municipality.

Thus, the constant percentage of 2.53% of Sabesp's direct revenues, which corresponds to the regulatory limit of 4% of the net revenue of the 25 municipalities considered until March/2021, was recognized in the tariff calculation.

6.3. Fund for Research, Development and Innovation (RDI)

As established in Technical Note NT.F-0043-2020 ARSESP Resolution 920, of November 22, 2019, and given that the implementation and monitoring of the fund for research, development and innovation is at the early stage, Arsesp decided to maintain the percentage used in the 2nd OTR, whereby over the fourth tariff cycle it will be possible to follow up the projects and check the existing demands, in order to change them for the next cycle, if necessary.

Therefore, the initial percentage of 0.05% of the direct required revenue of each regulatory year was included in the calculation of P0.

It is worth noting that all expenses and investments made as RD&I and included in Sabesp's BP were reversed, given that they should be made according to Resolution 920/2019.

6.4. Use of water sources

The cost of the use of water resources is an expense paid by the provider for the use of water resources for the company's operational activities. Accordingly, Arsesp is separating such Opex expense by allocating it in a specific line of the model and with a compensatory adjustment at the end of the cycle to the amount actually paid, considering that it is a non-manageable cost for the company.

The average amount spent between 2017-2019, corresponding to R$87,165,227/year was used for the projection.

At the end of the cycle, the amount actually paid by Sabesp over the cycle will be used by means of compensatory adjustment.

6.5. Water sources conservation program

Due to the impacts suffered in spring areas, most of the large Brazilian cities already live with the water scarcity and, consequently, with the increase in water risk. The southeastern region of Brazil, especially the state of São Paulo, an essential part of the industrial, commercial and services sector, has suffered from extreme weather events associated with the impacts resulting from changes in soil in areas of water sources with serious effects on the economy and people's quality of life. Reversing this water risk scenario is essential.

The paths to being this start with the implementation of the guidelines provided in the National Basic Sanitation Law (Law 11.445/07), which establishes, among its fundamental principles, that the different sanitation components are adequately carried out in order to protect the environment and comply with the environmental protection policies.

Water security in large Brazilian cities and the world relies on long-term planning and investments. Objectives such as the improvement, adequacy and expansion of water collection, storage and distribution systems are usually achieved through investments in conventional infrastructure. However, it increasingly makes sense to also adopt solutions based on natural resources.

The protection of water sources is the first step to guarantee drinking water supply and towards the resilience of cities. Services provided by functional ecosystems are diverse, but in the case of hydrological services, we can mention the increase in water residence time in the hydrographic basin, the increase in water infiltration capacity and, consequently, the recharge of aquifers, reduced sedimentation and increased useful life of reservoirs. Similarly, the adoption of good management practices in productive areas within areas of water sources can also contribute to the generation of the aforementioned ecosystem services, leading to benefits that are not offered by conventional infrastructure solutions.

The demand for conservation and protection of water sources is recognized by society when public hearings and consultations highlight considerations such as:

> "In addition, greater incentives are needed for strategic municipalities to maintain natural vegetated areas and uses compatible with the functions of water sources in order to support water production."

According to NT.F-0043-2020, with a view to expand water security and ensure water supply to the municipalities operated by the provider, including the inherent positive externalities, Arsesp highlighted the action DS 3 – Water Sources Conservation Program in its Regulatory Agenda, which is expected to be concluded in the second half of 2020. Regarding the local scope of the project, as correction to what was included in the technical note, the methodology should include investments and expenses in conservation and protection of water sources in the municipalities operated by Sabesp, not only the Metropolitan Region of São Paulo (MRSP), even though it is evident that the effects of the impacts of the last water crisis in this region were extremely severe.

The calculation and definition of the tariff are based in projections that consider all the municipalities operated by Sabesp; thus, it is not appropriate to foresee the application of the program in regional locations only, even though, considering the ceiling amount to be defined by Arsesp, it is possible to consider the feasibility of the use of resources, initially, in specific and/or priority water basins.

Considering the questionings received in Public Consultation 05/2020 related to Arsesp's powers to implement a specific program for conservation of water sources using funds from the tariff of sanitation services provided by Sabesp, the Agency sent a consultation to PGE/CJ ARSESP, which is pending response.

Also, in view of the need to detail the studies of action DS 3, including through the Technical Cooperation Agreement with TNC – The Nature Conservancy, where studies based on the organization's expertise regarding models to evaluate the actions' costs (interventions) provided for in the program, as well as studies to evaluate the return of these investments (expenses) in model water basins have been developed, in addition to the necessary interface and alignment with other existing public policies on the protection and conservation of water sources, Arsesp decided to postpone the inclusion of the Water Conservation Program, which may occur over Sabesp's 4th tariff cycle (providing for the proper compensatory adjustments), and the methodology should then be sent to specific public consultation.

Accordingly, once the studies of action DS3 are defined, the amount of funds for the water conservation program and the related tax effect will be defined, as well as the program's rules, selection criteria of the projects, interface between existing public policies, operationalization and supervision of the program.

7. CAPEX

7.1. Investment plan

In NT.F-0043-2020, Arsesp informed about the breakdown of information to be received by Sabesp regarding its investment plan. However, Sabesp did not send all the information on the requested breakdown. Even so, Arsesp carried out the proper analysis and presents its conclusions below. It is worth noting that Arsesp should implement a new Regulatory Accounting model over this cycle, so that Sabesp will have to adapt to the format for sending information.

In addition, Arsesp has been analyzing the methodology for annual certification of investments, which will provide gains in the analysis and agility of any corrections over the cycle with the provider.

As defined in the methodology of the 3rd OTR, Arsesp considers the projections of constructions for the purposes of calculation of Discounted Cash Flow, encouraging increased efficiency in asset construction and adherence between the amounts covered by the tariff and the benefits directly perceived by the user, through assets in service. The projections of the construction plan sent by Sabesp are presented per program in the table below. Arsesp's analysis on the main programs is detailed in Exhibit I to this Technical Note.

Table 7.1: Sabesp's Construction Plan per Program - R$ thousand - Dec/2020

Program/Product/Application/Segment	2021	2022	2023	2024	Total	%
TIETÊ PROJECT	940,230	1,357,533	942,223	1,078,400	4,318,386	21.95%
LOSS REDUCTION AND CONTROL	983,923	820,974	961,623	917,340	3,683,860	18.72%
VEGETATIVE GROWTH	704,529	752,405	744,743	733,152	2,934,829	14.91%
SPMR'S SEWAGE PROGRAM	423,830	312,633	733,680	556,228	2,026,372	10.30%
METROPOLITAN WATER PROGRAM - MWP	331,272	201,866	224,137	375,418	1,132,693	5.76%
ONDA LIMPA - SANTOS COASTAL AREA	0	733,603	33,081	321,846	1,088,530	5.53%
INTERIOR REGIONS' SEWAGE PROGRAM	109,802	127,622	165,771	338,243	741,438	3.77%
COASTAL REGIONS' WATER PROGRAM	93,015	191,558	127,134	173,050	584,757	2.97%
INFORMATION TECHNOLOGY	109,689	109,323	114,869	200,852	534,733	2.72%
COASTAL AREAS' SEWAGE PROGRAM	178,419	75,347	229,141	45,291	528,199	2.68%
INTERIOR REGION'S WATER PROGRAM	105,086	126,707	84,386	158,868	475,046	2.41%
SERVICES AND TECHNICAL STUDIES	76,432	87,701	78,504	145,777	388,414	1.97%
PRO-BILLINGS	93,622	142,481	0	54,245	290,348	1.48%
ENERGY EFFICIENCY	0	3,700	13,552	227,353	244,606	1.24%
VALE DO RIBEIRA PROGRAM	96,309	38,884	22,024	61,809	219,027	1.11%
OPERATIONAL SUPPORT	42,619	34,692	92,757	40,038	210,106	1.07%
VIDA NOVA (WATER SOURCES)	10,793	48	125,533	65	136,439	0.69%
R&D AND INNOVATION	32,775	12,300	7,600	8,700	61,375	0.31%
FACILITIES AND ADMINISTRATIVE EQUIPMENT	8,256	7,667	6,609	8,567	31,099	0.16%
ENVIRONMENTAL MANAGEMENT	12,957	5,406	5,050	5,050	28,463	0.14%
CLEAN STREAMS	0	10,339	0	0	10,339	0.05%
FLEET	5,844	1,300	550	935	8,629	0.04%
Overall Total	**4,359,402**	**5,154,091**	**4,712,968**	**5,451,228**	**19,677,688**	**100%**

Source: SABESP's BP.

Regarding the values projected by Sabesp in its Business Plan, Arsesp did not record investments in R&D and Innovation only (R$61.4 million in the period at prices of December 2020), given that Arsesp already have a percentage of the provider's revenue aimed to a R&D program (0.05% of direct revenue).

Accordingly, other investments incorporated to the model correspond to those projected by Sabesp in its Business Plan, adjusting only the currency from December 2020 to October 2020 and excluding the investments in R&D and Innovation.

For the projection of capitalizable expenses, the reference was the amount informed by Sabesp for the cycle (historical average) of R$214.5 million/year, corresponding to 6.88% p.a. of the investments eligible for such capitalizable expense.

Regarding capitalizable expenses, Sabesp had contributed to the public consultation process of the methodology, requiring that adjustments be made to its calculation by including a portion of these expenses to direct investments. Arsesp accepted the contribution, and Sabesp presented expenses after making the proper adjustments, which reduced the percentages in relation to the previous cycles.

Table 7.2: Amounts adopted by Arsesp for the Construction Plan (CAPEX) – R$ thousand Oct/20

R$ thousand Oct/20	2,021	2,022	2,023	2,024	Total
SYSTEM EXPANSION	2,692,269	3,747,838	3,023,885	3,352,623	12,816,614
SYSTEM IMPROVEMENT OR ASSET RENEWAL	1,404,372	1,165,984	1,388,874	1,482,454	5,441,684
INSTITUTIONAL DEVELOPMENT	124,330	118,808	122,562	211,275	576,975
SPECIAL SERVICES	81,788	93,107	83,870	151,437	410,202
ENERGY EFFICIENCY	0	3,716	13,612	228,348	245,676
OPERATIONAL DEVELOPMENT	42,806	34,844	93,163	40,214	211,026
TECHNOLOGICAL DEVELOPMENT AND/OR INNOVATION	0	0	0	0	0
Capitalizable Expenses	215,690	215,690	215,690	215,690	862,760
Capitalizable Expenses + Special Services (%)	7.26%	6.28%	6.77%	7.25%	6.88%
TOTAL CAPEX	**4,561,256**	**5,379,987**	**4,941,654**	**5,682,041**	**20,564,938**

Source: ARSESP.

7.2. Regulatory Interest on Construction Works in Progress - RICWP

Regulatory Interest on Construction Works in Progress - RICWP consist on the remuneration of constructions in progress (fixed assets in progress) used on the sum of main equipment (ME), supplemental equipment (SE) and additional costs (AC), based on the type of the eligible construction work. A period to apply the remuneration is determined for each type of construction, i.e. an average deadline is regulatorily determined per type of construction work and an investment disbursement flow is forecasted.

Accordingly, the RICWP follows a calculation method weighted by the defined disbursement deadline and according to the Weighted Average Cost of Capital (WACC) defined in each tariff revision. As detailed in section 8, Arsesp defined a WACC of 8.10% in this 3rd OTR.

Sabesp had requested a revision of the parameters used to calculate the RICWP. However, it did not present the requested studies and, because of that, Arsesp decided to maintain the methodology of the previous cycle, which is described in Arsesp Resolution 941/2019. The resolution defines the types of construction works eligible to the RICWP and the corresponding deadlines for application of remuneration, as follows:

i) Networks: 12 months;
ii) Treatment stations: 24 months; and
iii) Collections and Reservoirs: 18 months.

Moreover, the flow of disbursements was defined at 40% in the first half of the average term of each type of construction work and 60% in the second half of the average term.

Table 7.4 presents the calculation of RICWP for each type of construction work approved by Arsesp Resolution 941/2019, using the WACC of 8.10% approved for the 3rd OTR.

Table 7.3: RICWP Percentage per type of construction work

TREATMENT STATIONS											
d1	**d2**	**d3**	**d4**	**d5**	**d6**	**d7**	**d8**	**d9**	**d10**	**d11**	**d12**
3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%	3.33%
d13	**d14**	**d15**	**d16**	**d17**	**d18**	**d19**	**d20**	**d21**	**d22**	**d23**	**d24**
5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
RICWP =	**7.72 %**										

DISTRIBUTION NETWORKS AND COLLECTORS											
d1	**d2**	**d3**	**d4**	**d5**	**d6**	**d7**	**d8**	**d9**	**d10**	**d11**	**d12**
6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
RICWP =	**3.93 %**										

RESERVOIRS AND COLLECTIONS											
d1	**d2**	**d3**	**d4**	**d5**	**d6**	**d7**	**d8**	**d9**	**d10**	**d11**	**d12**
4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	4.44%	6.67%	6.67%	6.67%
d13	**d14**	**d15**	**d16**	**d17**	**d18**						
6.67%	6.67%	6.67%	6.67%	6.67%	6.67%						
RICWP =	**5.80 %**										

Source: Arsesp.

Therefore, the calculated WICWP percentages will be used on CAPEX amounts estimated for the term of the next tariff cycle, according to the estimated construction amounts previously indicated, taking into consideration the type of construction works eligible for this remuneration.

It worth noting that Arsesp defined RICWP percentages will not be used on Special Services, Operating Development, Institutional Development (vehicles, administrative facilities and IT), connections and water meters, thus maintaining the same criteria used to validate the asset base.

Investment amounts on which RICWP is applied and the calculation of the projected interest are shown in the table below.

Table 7.4: Projections of Interest on Construction Works in Progress - R$ thousand - Oct/20

Type	Description	% RICWP	2021 Investment	2022 Investment	2023 Investment	2024 Investment	2021 RICWP	2022 RICWP	2023 RICWP	2024 RICWP
1	Treatment Stations	7.72%	466,624	1,221,255	595,819	1,405,820	36,025	94,285	45,999	108,534
2	Distribution Networks and Collectors	3.93%	2,561,559	2,659,736	2,648,024	2,499,418	100,703	104,562	104,102	98,260
3	Reservoirs and Collections	5.80%	304,336	235,358	410,834	161,504	17,659	13,656	23,838	9,371
Total			**3,332,519**	**4,116,349**	**3,654,677**	**4,066,742**	**154,386**	**212,503**	**173,939**	**216,165**

Source: ARSESP.

8. WEIGHTED AVERAGE COST OF CAPITAL - WACC

The remuneration rate corresponding to the cost of capital to be applied in the remuneration the is part of the tariff calculation must be defied, in order to meet one of the fundamental assumptions of the model: the financial sufficiency of the company.

Arsesp calculated the Rate of Return of capital through the calculation of the Weighted Average Cost of Capital (WACC), similarly to the 1st and 2nd OTR. The variables that make up the calculation of WACC were presented for Public Consultation (CP 06/2020), whose final result was a rate of 8.10%.

Table 8.1: Summary of Sabesp's Weighted Average Cost of Capital for the 3rd OTR

Capital Structure	ARSESP
(A) Shareholders' Equity percentage (W_E)	64.19%
(B) Creditor's equity percentage (W_D)	35.81%
Cost of Equity (r_E)	
(1) Risk-Free Rate	4.50%
(2) Market Rate of Return	11.43%
(3) Market Risk Premium = (2)-(1)	6.94%
(4) Unlevered Beta	0.6436
(5) IR + CSLL (T)	34.00%
(6) Leveraged Beta = (4)*[1+(((B)/(A))*(1-(5)))]	0.8807
(7) Business and Financial Risk Premium = (6)*(3)	6.11%
(8) Brazil Risk Premium	2.41%
(9) U.S. Inflation Rate	2.03%
(10) r_E Nominal = (1)+(7)+(8)	13.02%
(11) r_E Real = [(10)+1]/[1+(9)]-1	**10.77%**
Cost of Creditor's Equity (r_D)	
(12) Risk-Free Rate = (1)	2.33%
(13) Brazil Risk Premium = (8)	2.41%
(14) Credit Risk	3.48%
(15) Nominal r_D before tax = (12)+(13)+(14)	8.22%
(16) Nominal r_D after Taxes = (15)*[1-(5)]	5.42%
(17) Real r_D after tax = [(1)+(16)/[1+(9)]-1	**3.33%**
WACC	
	8.10%

Source: ARSESP (NT.F-0042-2020).

9. DETERMINATION OF THE REGULATORY REMUNERATION BASE

The Regulatory Remuneration Base (RRB) of the 3rd Ordinary Tariff Revision (OTR) is obtaining by adding the values, updated and depreciated, of the Shielded Base and the Incremental Base. The Shielded Base corresponds to the Asset Remuneration Base of the 2nd OTR. The Incremental Base corresponds to the Asset Remuneration Base incorporated between July 1, 2016 and June 30, 2019, according to ARSESP Regulation 941, of December 31, 2019.

Public Consultation 09/2019, held from July 18, 2019 to September 24, 2019, resulted on the publication of ARSESP Resolution 941, on December 13, 2019, which defined the methodology and general criteria for the update of the RRB of Sabesp's 3rd OTR.

9.1. Shielded Base

The shielded base corresponds to the asset remuneration base evaluated and approved on the previous tariff cycle (2nd OTR), ended June 2016. For the 3rd OTR, the Shielded Base underwent the following changes:

a) Write-off of assets and/or transfer of quantities;

b) Revision of the utilization indexes;

c) Value update based on the IPCA-IBGE index;

d) Depreciation of these assets;

e) Evaluation of disallowances made in the 1st OTR.

9.2. Incremental Base

The incremental base is the Asset Remuneration Base of the incremental period, i.e. the period between the periodic tariff revisions. For Sabesp's 3rd OTR, the incremental period considered was between July 1, 2016 and June 30, 2019, base date to calculate the RRB.

Following the determinations of ARSESP Resolution 941/2019, Sabesp hired an appraisal company to prepare its Asset Report. Due to the impacts of public calamity arising from the COVID-19 pandemic, Arsesp's field inspection activities were limited, affecting the conclusion of valuation and validation of the asset base. Accordingly, the asset report delivered by Sabesp on November 3, 2020, without field inspections, but with the application of all other criteria established in Arsesp Resolution 941/2019, was therefore the alternative adopted.

After the asset valuation report is subject to verification by Arsesp, the compensatory adjustment will be made until the next tariff process.

Table 9.1 shows a summary of the amounts recognized by Arsesp for the shielded base, incremental base and total value of the Regulatory Remuneration Base of the 3rd OTR.

Table 9.1: Summary of the Regulatory Remuneration Base (ref. October/2020)

Updated Shielded Base	36,948,496
Incremental Base	10,276,621
Total RRB	**47,225,117**

Source: ARSESP.

Arsesp's detailed analysis on Sabesp's Asset Report for the 3rd OTR will be carried out at the end of the inspection and made available together with the application of the compensatory adjustment.

9.3. Average Depreciation

For the current calculation of P0, the technical depreciation adopted was calculated using the average useful life of the remuneration base presented on the appraisal report, of 44.79 years, or 2.23%.

Table 9.2: Average useful life of the remuneration base

	Depreciation	NRV	Depreciation	Average Annual Depreciation*	Useful life
Incremental	4,572,531,418.71	15,035,117,230.68	30.41%	3.31%	30.21
Shielded	42,790,583,485.43	83,991,481,537.46	50.95%	2.04%	49.02
Total	47,363,114,904.14	99,026,598,768.13	47.83%	2.23%	44.79

Source: ARSESP.

To calculate the values of technical depreciation of the asset base, it is necessary to estimate the gross regulatory remuneration base. The value obtained is R$ 100.5 billion, which is the result of the sum of the gross values of the incremental and shielded bases, less gross utilization indexes and the value of assets fully depreciated.

For the accounting depreciation, to be used in the financial flow, the technical depreciation value of the investments added to the average depreciation presented by Sabesp on the 2019 balance sheet was used (R$1.78 billion/year).

9.4. Asset base revaluation – Disallowances of the 1st OTR

As provided in regulatory action DEF 7 of the 2020-2021 Regulatory Agenda, Arsesp reassessed the disallowances made in the asset base of the 1st OTR, and updated the value after said revaluation, including it on the RRB of the 3rd OTR.

Arsesp reassessed the calculation of the changes in the disallowances of piping disallowances regarding what had been presented to the public consultation based on the contributions received, carrying out an analytical change (per assets). Such calculation carried out changes until December 2020, starting from the analytical Shielded Base of September 2011, remodeled and shared with Sabesp through Arsesp Official Letter OF.FF-0035-2020 and the analytical Shielded Base with changes until 2016, shared with Sabesp through Arsesp Official Letter OF.FF-0011-2020.

The method consisted of inserting the new values of UP 8 assets (piping) in the shared bases and making three sequential changes for pipes: (i) starting from the asset base - UP 8 - with reversal of disallowances - dated September 2011, changing it until June 2016; (ii) then, changes from July 2016 to June 2019; and (iii) changes from July 2019 to December 2020 (IPCA). The changes considered the calculation of the annual depreciation (annual dimensions) for the Shielded Base – UP 8 (pipeline) – with return of the disallowances.

The analytical change of the Shielded Base – UP 8 (Pipeline) until December 2020 was initially made without the return of disallowances. The following step was to insert the return of the disallowances on the analytical Shielded Base – dated September 2011 and making changes to this base date containing the return of the disallowances until December 2020. The difference between these Shielded Bases – UP8 corresponds to the gross, net and depreciation values of the disallowances.

Therefore, the value to be incorporated into the RRB for said revision is presented in the table below.

Table 9.3: Values for the reversal of disallowances of the 1st OTR in RRB

Reavaliação das Glosas - 1° RTO (UP 8)	Líquido (R$ out/2020)	3.197.341.406
	Bruto (R$ out/2020)	7.823.795.184

Source: ARSESP.

The details on action DEF 7 and on the measures to reverse asset disallowances in the 1st OTR can be found in Exhibit III of this Note.

9.5. Incorporated assets and depreciations after the asset report until December 2020

To obtain the Initial Net Regulatory Remuneration Base (NRRB $_0$) to be used in the cash flow, the value must also be updated to the reference date of the tariff cycle by adding the assets incorporated from July 2019 to December 2020.

In its Business Plan, Sabesp informed the investments made from July/2019 to June/2020, and estimated the investment of July/2020 to December/2020. Based on this information, Arsesp updated the amounts for the base date of the model, which totaled R$4.4 billion in the period (July/2019 to December/2020). In addition, Arsesp made changes to the asset base until December/2020, as shown below, including the period's depreciation and write-offs.

Table 9.4: Initial Regulatory Remuneration Base (R$ Oct/20)

RRB0 Jun/19 (prices of Oct/20)	50,422,458,087
Investments Jul/19-Dec/20	4,408,870,371
Depreciation Jul/19-Dec/20 additional CAPEX	95,494,840
Write-offs	98,996
RRB0 (prices of Oct/20)	**55,893,196,455**

Source: ARSESP.

It is worth noting that said amounts may be adjusted after the inspection of the asset base, in case of different results. In addition, they are object of compensatory adjustments at the end of the tariff cycle.

9.6. Regulatory Working Capital

The Net Regulatory Remuneration Base must include the amount of working capital, which are funds necessary to finance the continuity of short-term activities related to the service rendering. The calculation formulas of each component of the working capital were presented in Technical Note NT.F-0043-2020 and shown below.

Table 9.5: Breakdown of Regulatory Working Capital

Conta	Fórmula de cálculo
Contas a receber	Contas a receber[1]/Receita operacional[2] * Receita direta projetada ano t
Estoques	Estoques[1]/(Despesas de materiais gerais + Desp. materiais de tratamento)[2] * (Desp. materiais gerais + Desp. materiais tratamento) projetadas ano t
Demais contas a receber	Demais contas a receber[1]
Empreiteiros e fornecedores	Empreiteiros e fornec.[1]/(Desp. mat.gerais + Desp. mat.tratam. + Serv.terceiros + Energia + Desp.gerais + Desp.fiscais)[2] * (Opex - Desp.pessoal) projetados ano t
Salários, provisões e contrib. sociais	Salários, provisões e contrib. sociais[1]/Salários, encargos e benefícios[2] * Despesas de pessoal projetada ano t
Impostos e contribuições a recolher	Impostos e contribuições a recolher[1]/(Salários, encargos e benefícios + Desp. mat.gerais + Desp. mat.tratam. + Serv.terceiros + Energia + Desp.gerais + Desp.fiscais)[2] * Opex projetado ano t
Contas a pagar	Contas a pagar[1]/(Desp. mat.gerais + desp. mat.tratam. + Serv.terceiros + Energia + Desp.gerais + Desp.fiscais)[2] * (Opex - Desp.pessoal) projetados ano t
Outras obrigações	Outras obrigações[1]/(Salários, encargos e benefícios + Desp. mat.gerais + Desp. mat.tratam. + Serv.terceiros + Energia + Desp.gerais + Desp.fiscais)[2] * Opex projetado ano t

Source: (1) Sabesp's Balance Sheet; (2) Notes to the financial statements – Sabesp's Balance Sheet

The following amounts were obtained from the information made available in Sabesp's 2019 balance sheet:

Table 9.6: Projection of Regulatory Working Capital - R$ Oct/20

Description	2019	2021	2022	2023	2024
I - Current Assets	**3,057,401,589.77**	**2,914,206,212**	**2,976,738,863**	**3,035,150,891**	**3,083,242,952**
Cash and cash equivalents	606,073,619.93	581,808,156	592,642,418	600,104,248	598,229,984
Trade receivables	2,303,129,808.79	2,189,801,498	2,238,837,090	2,288,294,031	2,336,792,682
Inventories	72,014,906.53	66,413,303	69,076,101	70,569,358	72,037,031
Other Receivables	76,183,254.52	76,183,255	76,183,255	76,183,255	76,183,255
II - Current liabilities	**1,899,939,757.17**	**1,644,281,350**	**1,675,463,455**	**1,697,172,433**	**1,718,288,257**
Trade payables and contractors	377,820,165.17	289,111,779	298,131,119	304,019,336	309,705,532
Salaries, provisions and social contributions	607,445,235.75	618,128,492	621,219,134	624,325,230	627,446,856
Taxes and contributions payable	255,863,788.76	217,874,180	222,338,440	225,409,693	228,393,162
Accounts payable	484,581,185.73	370,806,383	382,374,326	389,926,382	397,219,333
Other liabilities	174,229,381.77	148,360,516	151,400,435	153,491,792	155,523,373
III - Regulatory Working Capital					
Inventories	1,157,461,832.60	1,269,924,862	1,301,275,408	1,337,978,458	1,364,954,695
Variation		112,463,030	31,350,546	36,703,050	26,976,237

Source: SABESP and ARSESP. Prepared by: ARSESP.

9.7. NRRB's annual update mechanism

The initial NRRB must also be updated on an annual basis for the period of the tariff cycle, as per the methodology described in Technical Note NT.F-0043-2020. The amounts obtained over the cycle are in millions of R$, at prices of October 2020, as follows:

Table 9.7: Final Regulatory Remuneration Base – R$ Oct/20

R$	2021	2022	2023	2024
NRRB (t-1)	55,893,196,455	58,399,969,520	61,531,879,182	64,015,025,048
Depreciation	2,321,331,947	2,491,931,542	2,669,150,329	2,851,428,693
Investments in fixed assets	4,715,641,983	5,592,490,659	5,115,593,145	5,898,205,263
Change in Working Capital	112,463,030	31,350,546	36,703,050	26,976,237
NRRBt	**58,399,969,520**	**61,531,879,182**	**64,015,025,048**	**67,088,777,855**

Source: ARSESP.

9.8. Inclusion of new municipalities on Sabesp's RRB

Throughout the tariff cycle, Sabesp may assume the operation of new municipalities, generating significant effects on its economic-financial balance, depending on the size of the municipalities. In the last cycle, the following municipalities were included in the base:

Table 9.8: RRB new municipalities – R$ Oct/20

New Municipality	Updated Carrying Amount (CA)*	Accumulated Depreciation	Value Net of Depreciation	Portion of the depreciated utilization index	Net Regulatory Asset Base
Aguaí	144,735,576	15,253,272	129,482,305	5,027,512	124,454,792
Iperó	86,177,799	31,357,074	54,820,725	1,057,155	53,763,570
Pereiras	5,894,997	713,381	5,181,616	36,566	5,145,050
Saltinho	60,666,011	6,963,354	53,702,656	361,153	53,341,504
Santa Branca	46,709,710	5,539,875	41,169,836	196,054	40,973,781
Santo André	2,894,316,210	1,779,742,011	1,114,574,200	106,707,270	1,007,866,930
Guarulhos	2,936,587,787	1,512,894,834	1,423,692,953	65,747,942	1,357,945,011
Total	**6,175,088,090**	**3,352,463,801**	**2,822,624,289**	**179,133,652**	**2,643,490,638**

*bases changed by December/2020

Source: ARSESP.

Considering the potential unbalance that the inclusion of new markets may generate in the cash flow results, Arsesp determined that, at the time of the start of service provision in municipalities whose asset base value to be incorporated in Sabesp's RRB, net of depreciation, is higher than 1% of the NRRB of the cycle in progress, it will reassess the maximum tariff, with the inclusion of the new assets, as well as the markets and cost projections (considering exclusively the marginal cash flow of the remaining cycle), provided there is enough

time available for it.

10. TAXES AND CONTRIBUTIONS

10.1. Cofins/Pasep

As per NT.F 0043-2020, item 6.5.1, as from the 3rd OTR, the Cofins/Pasep rate will be calculated in the tariff table and not within the P0 determination model.

The rate will be applied on an annual basis by Sabesp upon billing calculation, together with other taxes. Accordingly, the entire calculation of the 3rd OTR will not consider the effect of PASEP and COFINS, including when determining P0.

10.2. Income Tax and Social Contribution – IRPJ/CSLL

As proposed in Technical Note NT.F-0043-2020, these taxes will be calculated at a rate of 34%. The tax base is obtained by including the alternative revenues to the direct revenues and deducing OPEX costs, credits from PPPs, asset lease, municipal funds, expenses with payment of water resources, RD&I fund, irrecoverable revenues and book depreciation. The projected values are as follows.

Table 10.1: Projection of IRPJ/CSLL - R$ Oct/2020

Description	2021	2022	2023	2024
(+) Direct Required Revenue -> Tariff	17,328,298,303	17,719,668,444	18,114,401,520	18,501,486,150
(+) Alternative Revenues	149,270,351	149,270,351	149,270,351	149,270,351
(-) Operating Expenses -> OPEX	6,330,150,226	6,459,855,532	6,549,088,183	6,635,770,366
(-) PPP and Asset Lease	651,547,646	651,853,485	652,162,792	542,989,448
(-) Irrecoverable Revenues	244,173,950	249,688,767	255,250,971	260,705,401
(-) Municipal Funds	438,823,249	448,734,338	458,730,591	468,533,154
(-) Use of Water Resources	87,165,227	87,165,227	87,165,227	87,165,227
(-) R&D&I	8,664,149	8,859,834	9,057,201	9,250,743
(-) Book Depreciation	1,897,575,811	2,068,175,406	2,245,394,193	2,427,672,557
IRPJ/CSLL	2,658,619,255	2,684,166,110	2,722,319,723	2,794,347,666

Source: ARSESP.

10.3. Regulation, Control and Oversight Fee

The regulation, control and oversight fee is only charged in municipalities with services regulated by Arsesp, at a rate of 0.5% of direct revenue, directly charged in the users' bills. In this sense, it is not directly included in the calculation of the balance tariff.

11. ALTERNATIVE REVENUES

Arsesp, by means of Resolution 1,107, of December 29, 2020, defined the classification and criteria for approval of Sabesp's alternative revenue-generating activities. As per article 6 of said Resolution, Arsesp, in its Ordinary Tariff Revision process, would define the criteria and the sharing percentage of revenues arising from alternative activities.

Accordingly, for the fourth tariff cycle, Arsesp defined the sharing percentage, as shown below.

Table 11.1: Sharing percentage – Alternative revenues

Revenue Description	% Sharing
Supplemental Revenue	100%
Ancillary Revenue	35%
Revenue from Related Projects	100%

Source: ARSESP.

Sharing percentages equal to 100% were used because Sabesp does not provide costs information related to alternative revenues. It is expected that, with the implementation of regulatory accounting, Sabesp will make the proper allocation of costs so that it is possible to adopt the methodology proposed in Resolution 107/2020.

The only exception for this cycle will be the revenues obtained from the sale of reused water. Recognizing its importance in environmental terms, Arsesp adopted a sharing percentage of 10% for revenues related to this activity (that is, Sabesp is encouraged to carry out this activity, given its high positive impact, remaining with 90% of revenues earned).

Considering the historical share of reuse water in total ancillary revenues and a share of 100% for the other activities, the sharing value for ancillary revenues in the 3rd OTR is 35% (thus, this percentage will return to users for purposes of affordability, while the provider will remain with 65% of revenue).

Throughout this cycle, Arsesp will evaluate the alternative revenues and will establish the sharing percentages individually, according to the methodology indicated in the above-mentioned resolution. At the end of the cycle, this item will be subject to compensatory adjustment, based on what is actually carried out in the period.

For the inclusion of alternative revenue in the economic-financial model, exclusively considering the alternative activities, which excludes activities such as fines, interest and account restructuring, the average amount earned in the 2017-2019 period was used by multiplying the percentage determined above.

The difference between the projected values and the values actually realized in the cycle will be subject to compensatory adjustment for the following cycle.

Table 11.2: Shared value of alternative revenues (R$ Oct/2020)

Revenue Description	Value shared in the cycle (R$)
Supplemental Revenue	114,061,535
Ancillary Revenue	18,450,152
Revenue from Related Projects	16,758,665
Total	**149,270,351**

Source: ARSESP.

12. COMPENSATORY ADJUSTMENTS OF THE CYCLE ENDED

Three compensatory adjustments should be made in the 2021-2024 tariff cycle. The first is the calculation of the compensatory adjustments related to the previous cycle. The second refers to the compensatory adjustment resulting from the suspension of users under the Social Residential and Favela Residential categories from paying bills because of the effects of the COVID-19 pandemic, according to ARSESP Resolution 979, of April 9, 2020, in addition to the deliberations that extended its validity. The third adjustment refers to the postponement of the application of the Tariff Adequacy Plans of some municipalities, in order to align their base date to Sabesp's general adjustment date.

For the first adjustment, it is necessary to compare the P0 defined on the 2nd OTR and the P0 obtained from a new discounted cash flow, containing the values realized for the variables that are the object of the compensatory adjustment. The comparison is made at December/2016 prices.

Table 12.1: Discounted cash flow of the 2017-2020 cycle with no compensatory adjustments

DISCOUNTED CASH FLOW - 2nd OTR						
Breakdown	**Items of**	**Present Value**	**Tariff Cycle - R$ (Dec/16)**			
		2016	**2017**	**2018**	**2019**	**2020**
Billed Volume (A+E) - (1,000 m³)	**FV**		3,707,335,125	3,806,967,040	3,907,918,862	4,006,722,677
(+) Direct Required Revenue -> Tariff	**DRR**	**46,063,282,247**	13,433,592,644	13,794,610,601	14,160,411,269	14,518,428,592
(+) Indirect Revenue	**IR**	**727,785,334**	212,246,528	217,950,498	223,730,033	229,386,594
(+) Other Revenues	**OR**	**264,992,161**	80,202,629	80,202,629	80,202,629	80,202,629
(-) COFINS/PASEP	**COP**	**3,088,171,264**	900,805,722	924,872,763	949,258,640	973,125,646
(-) Operating Expenses -> OPEX	**OPEX**	**17,782,984,420**	5,257,096,362	5,339,129,123	5,422,973,305	5,546,558,936
(-) PPP and Asset Lease	**PPP**	**1,530,857,286**	172,602,423	576,365,823	576,365,823	576,365,823
(-) Municipal Funds	**MFS**	**847,977,151**	247,298,479	253,944,444	260,678,454	267,269,181
(-) R&D&I	**RDI**	**5,314,056**	-	-	-	7,259,214
(-) Income tax/Social contribution	**IRCS**	**6,395,387,035**	1,967,144,277	1,878,917,700	1,930,952,454	1,967,151,945
(-) Irrecoverable Revenues	**RINC**	**593,072,738**	172,959,832	177,608,001	182,317,748	186,927,283
(-) Investments	**CAPEX**	**10,112,120,549**	2,668,555,531	3,877,346,417	2,309,119,124	3,413,526,547
(-) Regulatory Interest on Construction Works in Progress	**RICWP**	**297,919,066**	91,255,480	112,118,263	53,469,213	102,815,339
(-) Compensatory adjustments	**CAD**	**-578,900,443**	-156,462,317	-169,151,411	-182,869,591	-197,700,314
(-) Working Capital Variation	**WkVar**	**595,474,113**	519,525,322	71,806,280	38,563,988	31,370,451
(-) Initial Capital Base	**BRL0**	**39,032,454,982**	-	-	-	-
(+) Final Capital Base	**BRLT**	**32,646,772,475**	-	-	-	**44,596,802,511**
= Free Cash Flow + Bdk		**-39,032,454,982**	**1,885,260,691**	**1,049,806,325**	**2,923,514,772**	**46,550,150,276**
= Free Cash Flow + Bdk (Discounted)		**-39,032,454,982**	**1,743,835,622**	**898,209,100**	**2,313,703,431**	**34,076,706,830**

			Maximum Average Tariff - P0 (R$/m3)		
Net Present Value =	**-**		**Calculated**	**Current**	**Variation**
Internal Rate of Return (IRR) =	**8.11%**		**3.6235**	**3.3762**	**7.3264%**
		Amounts in Apr/18	**3.7892**	**3.6425**	**4.0272%**

Source: ARSESP.

For the 2017-2020 cycle, the following adjustments were made:

- Use of actual net percentages of Pasep/Cofins.
- Use of actual amounts of Other Revenues, Indirect Revenues, Working Capital, PPP and Asset Lease, Municipal Sanitation and Investment Funds.

The discounted cash flow arising from the adjustments made is as follows.

Table 12.2: Discounted cash flow of the 2017-2020 cycle with compensatory adjustments

DISCOUNTED CASH FLOW - COMPENSATORY ADJUSTMENTS						
Breakdown	**Items of**	**Present Value**	**Tariff Cycle - R$ (Dec/16)**			
		2016	**2017**	**2018**	**2019**	**2020**
Billed Volume (A+E) - (1,000 m³)	**FV**	**15,428,943,705**	3,707,335,125	3,806,967,040	3,907,918,862	4,006,722,677
(+) Direct Required Revenue -> Tariff	**DRR**	**44,946,330,034**	13,107,852,048	13,460,115,965	13,817,046,620	14,166,382,664
(+) Indirect Revenue	**IR**	**591,614,160**	175,609,609	177,830,611	192,646,410	170,160,144
(+) Other Revenues	**OR**	**288,136,067**	90,472,525	98,994,866	76,987,602	80,353,280
(-) COFINS/PASEP	**COP**	**3,038,919,038**	859,007,792	913,506,606	927,748,786	995,198,337
(-) Operating Expenses -> OPEX	**OPEX**	**17,782,984,420**	5,257,096,362	5,339,129,123	5,422,973,305	5,546,558,936
(-) PPP and Asset Lease	**PPP**	**1,618,752,737**	481,653,711	322,300,464	624,297,426	551,055,083
(-) Municipal Funds	**MFS**	**846,405,201**	242,757,918	256,838,130	266,865,367	260,788,381
(-) R&D&I	**RDI**	**5,185,200**	-	-	-	7,083,191
(-) Income tax/Social contribution	**IRCS**	**5,969,523,113**	1,759,531,284	1,848,665,255	1,792,963,087	1,832,275,916
(-) Irrecoverable Revenues	**RINC**	**578,691,784**	168,765,866	173,301,324	177,896,868	182,394,631
(-) Investments	**CAPEX**	**8,741,869,670**	2,232,109,506	3,080,944,142	2,645,465,333	2,660,379,690
(-) Regulatory Interest on Construction Works in Progress	**RICWP**	**-**				
(-) Compensatory adjustments	**CAD**	**-578,900,443**	-156,462,317	-169,151,411	-182,869,591	-197,700,314
(-) Working Capital Variation	**WkVar**	**453,723,070**	33,838,885	-6,530,036	233,009,905	332,771,455
(-) Initial Capital Base	**BRL0**	**39,032,454,982**	-	-	-	-
(+) Final Capital Base	**BRLT**	**31,663,528,511**	-	-	-	**43,253,651,763**
= Free Cash Flow + Bdk		**-39,032,454,982**	**2,495,635,175**	**1,977,937,845**	**2,178,330,147**	**45,499,742,545**
= Free Cash Flow + Bdk (Discounted)		**-39,032,454,982**	**2,308,422,140**	**1,692,313,837**	**1,723,955,693**	**33,307,763,313**

		Maximum Average Tariff - P0 (R$/m3)		
		Calculated	**Current**	**Variation**
Net Present Value =	**-**			
Internal Rate of Return (IRR) =	**8.11%**	**3.5357**	**3.3762**	**4.7239%**

Source: ARSESP.

To determine the compensatory adjustment, the required revenue authorized in the 2017-2020 cycle is calculated by using the projected market for the cycle. The required revenue is then calculated by using the compensatory adjustments and the same reference market. The difference between revenues is obtained and the values are adjusted to the October 2020 currency and to present value using the regulatory WACC of the cycle ended. The table below shows the calculation of the compensatory adjustment to be applied in this tariff cycle.

Table 12.3: Calculation of the compensatory adjustments of the tariff cycle ended

	2017	2018	2019	2020
IPCA (accumulated since Dec/16)	0.96%	3.67 %	8.41 %	11.99 %
X Factor (accumulated)		0.69 %	1.39 %	2.09 %
Authorized Required Revenue in the cycle (R$ March - current)	13,562,958,167	14,205,361,563	15,155,039,899	15,956,253,150
Required Revenue with Compensatory Adjustments (R$ March - current)	13,234,080,688	13,860,906,950	14,787,557,285	15,569,342,548
Differential (R$ March - current)	-328,877,479	-344,454,612	-367,482,614	-386,910,602
Differential (R$ Oct/20)	-370,922,891	-378,348,704	-385,982,835	-393,394,450
Differential Adjusted by WACC	-468,685,199	-442,205,343	-417,286,043	-393,394,450
Compensatory Adjustments of the 2nd OTR				**-1,721,571,035**

Source: ARSESP.

The first compensatory adjustment corresponds to **R$1,721,571,035,** to be returned to users.

It is worth noting that cash flow values for 2020 are still to be adjusted based on what was actually realized, when data is available and adjusted for the next annual tariff adjustment in 2022, for PASEP/COFINS, Other Revenues, Indirect Revenues, PPP and Asset Lease, and Municipal Sanitation Funds.

The second compensatory adjustment, referring to the suspension of accounts because of the effects of the COVID-19 pandemic, is shown below:

Table 12.4: Compensatory adjustments because of Covid-19

Unbilled Month	Unbilled (R$ current)	Unbilled (capitalized Dec/20)
Mar/20	6,055,280	6,419,979
Apr/20	28,090,444	29,589,378
May/20	28,441,464	29,765,078
Jun/20	29,244,586	30,407,338
Jul/20	30,045,684	31,037,937
Total	**121,877,459**	**127,219,710**

Source: ARSESP.

Considers only amounts not billed between March/2020 and July/2020, since article 1, item III of Arsesp Resolution 979/2020 determined to "Exempt consumers of the Social Residential and Favela Residential categories from paying bills due in April, May and June 2020". After this resolution, there were two other postponements, supported by articles 1, item III of Arsesp Resolutions 1,005/2020 and 1,017/2020, which determined to "Exempt consumers of the Social Residential and Favela Residential categories from paying bills due in July 2020". Finally, the same article and item of Arsesp Resolution 1,038/2020, determined to "Exempt consumers of the Social Residential and Favela Residential" categories from paying bills due in August 2020. Thus, the last billing month due is August/2020 and, therefore, the last unbilled amount refers to July/2020.

Capitalization is carried out using the WACC of the second cycle of 8.11%, and comes to a second adjustment of **R$127,219,710,** to be paid to Sabesp.

The third compensatory adjustment due corresponds to the postponement of the application of the Tariff Adequacy Plans (PATs) of the municipalities of Aguaí, Guarulhos, Iperó, Mauá, Pereiras, Santa Branca, Santa Isabel, Santo André and Tapiratiba. The alignment of the base date of these municipalities and the postponement of the adjustments generated a revenue difference that requires compensation. Said compensation is calculated as follows:

Table 12.5: Compensatory adjustments arising from the postponement of PATs.

Municipality	Compensatory Adjustment
Iperó	188,710
Pereiras	107,648
Santa Branca	169,800
Santa Isabel	281,820
Aguaí	282,021
Santo André	22,797,643
Guarulhos	16,660,973
Mauá	2,702,098
Tapiratiba	33,801
PAT Adjustment	**43,224,515**

Source: ARSESP.

It is worth noting that for the municipalities of Guarulhos, Santo André and Tapiratiba, the October/2020 marked as considered as proxy for the January/2021 to May/2021 market, given that this information is not available yet.

This value should be changed in the compensatory adjustment using the realized volumes, in the next annual tariff adjustment. Regarding the municipality of Mauá, both sewage volumes measured by BRK Ambiental (service provider in the municipality) and the actual tariff applied by such service provider observed in 2020 were used as future market proxy. This municipality should also undergo compensatory adjustment changes in the next annual compensatory adjustment.

Therefore, the third adjustment comes to **R$43,224,515,** to be received by Sabesp.

Finally, the table below consolidates the three compensatory adjustments, totaling **R$1,551,126,810,** to be returned to users.

Table 12.6: Summary of compensatory adjustments

	2017	2018	2019	2020
IPCA (accumulated since Dec/16)	0.96%	3.67 %	8.41 %	11.99 %
X Factor (accumulated)		0.69 %	1.39 %	2.09%
Authorized Required Revenue in the cycle (R$ March - current)	13,562,958,167	14,205,361,563	15,155,039,899	15,956,253,150
Required Revenue with Compensatory Adjustments (R$ March - current)	13,234,080,688	13,860,906,950	14,787,557,285	15,569,342,548
Differential (R$ March - current)	-328,877,479	-344,454,612	-367,482,614	-386,910,602
Differential (R$ Oct/20)	-370,922,891	-378,348,704	-385,982,835	-393,394,450
Differential Adjusted by WACC	-468,685,199	-442,205,343	-417,286,043	-393,394,450
Compensatory Adjustments of the 2nd OTR				**-1,721,571,035**
Adjustment - measures to fight the pandemic (Arsesp Resolution 979/2020)				**127,219,710**
Adjustment - Postponements of PATs				**43,224,515**
TOTAL				**-1,551,126,810**

Source: ARSESP.

Arsesp accepted the contribution received in the Public Consultation for the compensatory adjustments no longer be a direct part of cash flow, due to the indirect effects of such usage. Accordingly, for this tariff revision, the compensatory adjustment was directly applied to the company's required revenue.

12.1. Compensatory adjustments for the fourth tariff cycle

Regarding the 4th Tariff Cycle, the compensatory adjustments to be made by the end of the cycle are as follows:

- Amounts actually received from the charging of monitoring, collection and/or treatment of non-domestic effluents and the application of the pollutant concentration factor, toxicity or discharge flow in public sewage system (K factor). The amounts received should be fully reduced from the company's direct revenue in the cash flow. Arsesp will also periodically monitor these values and analyze the preparation of a specific regulation on the matter.
- Actual amounts for purposes of sharing of alternative revenues, considering the percentages to be defined by Arsesp, after their approval;
- Amounts actually paid for the use of water resources;

- Actual expenditures with Municipal Basic Sanitation Fund, for approved municipalities and limited to 4% of the direct municipal revenue;
- Monitoring of expenses with Outsourced services (corresponding to an additional R$300 million included in the cycle);
- Actual bonus amount, not related to capital costs in the performance contracts;
- Actual amounts related to the payment of PPP costs and asset lease;
- Amounts actually approved by Arsesp for RD&I;
- Amounts related to the water sources protection fund, in case of its implementation over the cycle (in this case, the compensatory adjustment may occur within the tariff cycle);
- Regulatory Remuneration Base, including actual constructions, write-offs, depreciation and working capital;
- Actual book depreciation for calculation of IRPJ/CSLL; and
- Corporate Income Tax (IRPJ) and Social Contribution on Net Income (CSLL): adjusted because of changes in their items.

Compensatory adjustments will be applied, already capitalized, over the maximum margin (P0) to be authorized for the fifth cycle.

13. MAXIMUM TARIFF – P0 (R$/M³)

Accordingly, the P0 calculated, excluding the compensatory adjustment referred to in the previous section, was R$5.0630/m³ (October 2020 price).

Table 13.1: Calculation of P0 for Sabesp's fourth tariff cycle

Breakdown	Items of Formula	Present Value	Tariff Cycle - R$ (Oct/20)			
		2020	2021	2022	2023	2024
Volume (A+E) - (1,000 m³)	FV		3,422,527,133	3,499,826,987	3,577,791,057	3,654,244,476
(+) Direct Required Revenue -> Tariff	DRR	59,076,061,687	17,328,298,303	17,719,668,444	18,114,401,520	18,501,486,150
(+) Alternative Revenues	AR	493,251,819	149,270,351	149,270,351	149,270,351	149,270,351
(-) Operating Expenses -> OPEX	OPEX	21,425,521,966	6,330,150,226	6,459,855,532	6,549,088,183	6,635,770,366
(-) PPP and Asset Lease	PPP	2,074,250,463	651,547,646	651,853,485	652,162,792	542,989,448
(-) Municipal Funds	MFS	1,496,047,035	438,823,249	448,734,338	458,730,591	468,533,154
(-) Use of Water Resources	UWR	288,030,450	87,165,227	87,165,227	87,165,227	87,165,227
(-) R&D&I	RDI	29,538,031	8,664,149	8,859,834	9,057,201	9,250,743
(-) Income tax/Social contribution	IRCS	8,956,851,443	2,658,619,255	2,684,166,110	2,722,319,723	2,794,347,666
(-) Irrecoverable Revenues	RINC	832,443,849	244,173,950	249,688,767	255,250,971	260,705,401
(-) Investments in Fixed Assets	CAPEX	16,894,589,695	4,561,255,853	5,379,987,180	4,941,654,197	5,682,040,589
(-) Regulatory Interest on Construction Works in Progress	RICWP	620,596,167	154,386,129	212,503,479	173,938,948	216,164,674
(-) Working Capital Variation	WkVar	179,660,575	112,463,030	31,350,546	36,703,050	26,976,237
(-) Initial Capital Base	BRL0	55,893,196,455	-	-	-	-
(+) Final Capital Base	BRLT	49,121,412,623	-	-	-	67,088,777,855
= Free Cash Flow + Bdk		-55,893,196,455	2,230,319,940	1,654,774,297	2,377,600,989	69,015,590,852
= Free Cash Flow + Bdk (Discounted)		-55,893,196,455	2,063,110,119	1,415,954,344	1,881,935,342	50,532,196,651

Net Present Value =	-	Calculate P0	Maximum Average Tariff - P0 (R$/m3)	Tariff with compensatory adjustment -
Internal Rate of Return (IRR) =	8.10%		5.0630	4.9534

Source: ARSESP.

With the application of the compensatory adjustment, the final P0 is R$4.9534/m³. The adjusted required revenue is as shown in the table below.

Table 13.2: Required Revenue for Sabesp's fourth tariff cycle

Year	Market	P0	Required Revenue	Adjusted P0	Adjusted revenue
2021	3,422,527,133	5.0630	17,328,298,303	4.9534	**16,953,236,310**
2022	3,499,826,987	5.0630	17,719,668,444	4.9534	**17,336,135,448**
2023	3,577,791,057	5.0630	18,114,401,520	4.9534	**17,722,324,732**
2024	3,654,244,476	5.0630	18,501,486,150	4.9534	**18,101,031,117**

Source and Preparation: Arsesp.

The P0 value should be adjusted to the application date, considering the accumulated inflation from October 2020 (cash flow base data) to February 2021. The effect of the General Quality Index should also be included. With such adjustments, the P0 should be used as average reference for the tariff structure to be applied as from May 10, 2021.

Considering the change in the tariff structure, users will not notice consistent effects over the cycle. The Technical Note addressing the change in the tariff structure presents the expected impacts over the cycle for the different user, consumption and region segments.

It is worth noting that the approved P0 should undergo adjustments over the cycle, considering the results from the asset base inspection, the correction of the compensatory adjustment values, with inclusion of the final values for 2020, and the markets of the municipalities that underwent changes in the base date of the tariff calculation. Such adjustments should be applied to the same economic-financial model presented in this Technical Note. The compensatory adjustment will include the recalculation of P0 for the remaining period (after application of the adjustment), considering the offsetting of revenue differences capitalized in the period elapsed until the adjustment.

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EXHIBIT I

ANALYSIS OF SABESP'S INVESTMENT PLAN

1. ANALYSIS OF SABESP'S INVESTMENT PLAN

Under Sabesp's 3rd Tariff Revision, the provider presented a business plan that includes the investment plan for the 2021 - 2024 period, as follows.

Table 1: Sabesp's Investment Plan – Dec/20 Values

	2021	2022	2023	2024	Total
EXCLUSIVE	**3,290,793**	**4,511,078**	**3,930,958**	**4,819,672**	**16,552,500**
SYSTEM EXPANSION	1,775,532	3,281,604	2,547,018	3,013,934	10,618,088
SYSTEM IMPROVEMENT OR ASSET RENEWAL	1,298,227	1,038,122	1,130,129	1,232,972	4,699,450
INSTITUTIONAL DEVELOPMENT	122,922	118,090	121,828	210,154	572,994
ENERGY EFFICIENCY	0	0	13,552	227,353	240,906
OPERATIONAL DEVELOPMENT	33,777	24,095	87,777	35,058	180,707
SPECIAL SERVICES	27,558	36,866	23,055	91,501	178,980
TECHNOLOGICAL DEVELOPMENT AND/OR INNOVATION	32,775	12,300	7,600	8,700	61,375
SHARED	**1,068,610**	**643,013**	**782,010**	**631,556**	**3,125,188**
SYSTEM EXPANSION	905,004	449,900	463,689	324,078	2,142,670
SYSTEM IMPROVEMENT OR ASSET RENEWAL	100,024	122,780	252,692	243,022	718,519
SPECIAL SERVICES	53,873	55,835	60,450	59,276	229,435
OPERATIONAL DEVELOPMENT	8,842	10,597	4,980	4,980	29,399
ENERGY EFFICIENCY	0	3,700	0	0	3,700
INSTITUTIONAL DEVELOPMENT	866	200	200	200	1,466
TOTAL	**4,359,402**	**5,154,091**	**4,712,968**	**5,451,228**	**19,677,688**
SYSTEM EXPANSION	2,680,536	3,731,504	3,010,706	3,338,012	12,760,758
SYSTEM IMPROVEMENT OR ASSET RENEWAL	1,398,252	1,160,903	1,382,821	1,475,994	5,417,969
INSTITUTIONAL DEVELOPMENT	123,789	118,290	122,028	210,354	574,461
SPECIAL SERVICES	81,432	92,701	83,504	150,777	408,414
ENERGY EFFICIENCY	0	3,700	13,552	227,353	244,606
OPERATIONAL DEVELOPMENT	42,619	34,692	92,757	40,038	210,106
TECHNOLOGICAL DEVELOPMENT AND/OR INNOVATION	32,775	12,300	7,600	8,700	61,375

Note that the highest investments are in system expansion (65%), followed by system improvement and asset renewal (28%). In addition, the amount aimed to system expansion (78%) is related to sewage. Thus, this supports what has been shown in its business plan - that the focus is on the expansion of sewage collection and treatment.

When we analyze network expansion as a whole, we note a division between exclusive and shared investments.

Exclusive investments

Sabesp's network is divided into four typologies: 1) network, which refers to pipelines for distribution of water or collection of sewage, 2) sewer line, 3) trunk collector and 4) interception; the last three items refer to sewage services. Connections consist of additional information to the network extension.

Investments estimated to expand services totals a little more than R$10.6 billion, distributed in 376 municipalities.

Of the total, investments estimated for expansion of water supply is approximately R$2.15 billion. Of this amount, approximately R$812 million is for the expansion of water supply networks with construction of a little more than 2,620 km of aqueducts in 305 municipalities.

Table 2: Exclusive investments in network - Water

	2021	2022	2023	2024	TOTAL
Amounts in millions of R$	218	187	209	198	**812**
Extension in KM	670	583	677	691	**2,621**

In addition, 978,761 connections at approximately R$449 million should be constructed. The remaining of the invested amount (R$889 million) is related to water adduction, collection, water elevation, water meters, sludge, final destination and treatment, among others.

Regarding sewage, a total of R$8.5 billion should be invested in system expansion. Of this total, a little more than R$2.735 billion should be invested in the expansion of the sewage collection network with construction of 4,036 km of network, and 1,085,056 connections at approximately R$849 million. As for sewer line, approximately R$174 million are expected to be invested in the construction of 216 km of network; while for trunk collector investments are expected to reach nearly R$2.6 billion in the construction of 550 km, and for interception, R$58.8 million should be invested in the construction of 19 km. The R$2.08 billion remaining are related to sewage elevation, outfalls, sludge and final disposal, and treatment, among others.

Table 3: Exclusive investments in network - Sewage

	2021	2022	2023	2024	TOTAL
INVESTMENT	Amounts in million R$	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million
TRUNK COLLECTOR	255	821	693	792	**2,562**
INTERCEPTION	15	0	43	-	**58**
SEWER LINE	22	66	36	50	**174**
NETWORK	596	597	762	786	**2,742**
TOTAL	**889**	**1,484**	**1,534**	**1,628**	**5,536**
INVESTMENT	**Extension in Km**	**Extension in Km**	**Extension in Km**	**Extension in Km**	**Extension in Km**
TRUNK COLLECTOR	33	243	122	152	**551**
INTERCEPTION	4	0	15	-	**19**
SEWER LINE	36	74	62	43	**216**
NETWORK	924	976	1,062	1,074	**4,036**
TOTAL	**998**	**1,293**	**1,261**	**1,270**	**4,822**

To summarize, of the total investments estimated for expansion, of approximately R$10.6 billion, nearly R$6.3 billion should be invested in the construction of network in the above-mentioned typologies, nearly R$1.3 billion in water and sewage connections, and the remaining, of approximately R$3.0 billion, in other investments, such as sludge and final destination, sewage pumping stations, raw water collection, management, among others.

Shared investments

Shared investments are those that serve more than one municipality. Shared investments are estimated at nearly R$3.1 billion, of which approximately R$1.2 billion for water and nearly R$1.7 billion for sewage. Approximately R$2.14 billion are expected to be invested in system expansion, of which R$673 million for water and R$1.47 billion for sewage.

The tables below show the extensions and costs estimated for the expansion of water and sewage network systems.

Table 4: Shared investments in network - Water

	2021	2022	2023	2024	TOTAL
INVESTMENT	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million
RAW WATER ADDUCTION	82	2	-	-	**84**
TREATED WATER ADDUCTION	49	24	142	13	**227**
TOTAL	**130.31**	**25.56**	**141.67**	**12.70**	**310.24**

INVESTMENT	Extension in Km	Extension in Km	Extension in Km	Extension in Km	Extension in Km
RAW WATER ADDUCTION	3	-	-	-	**3**
TREATED WATER ADDUCTION	8	5	39	1	**53**
TOTAL	**10.62**	**4.60**	**38.85**	**1.31**	**55.39**

R$310 million should be invested in extension of 55 km of water network in the cycle.

Regarding shared investments in network (sewage):

Table 5: Shared investments in network - Sewage

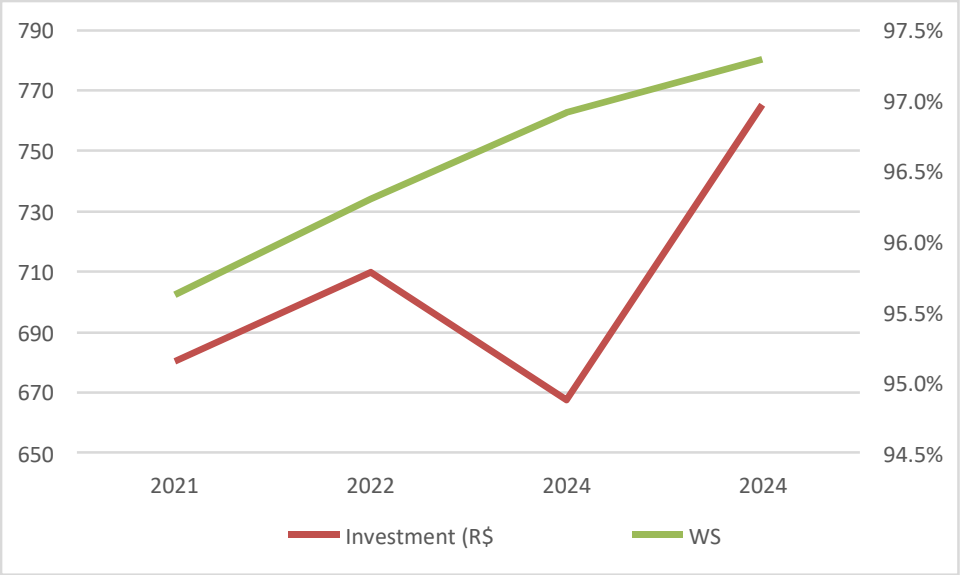
	2021	2022	2023	2024	TOTAL
INVESTMENT	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million	Amounts in R$ million
TRUNK COLLECTOR	186	109	95	23	**413**
OUTFALLS	-	-	32	-	**32**
INTERCEPTION	450	-	45	-	**494**
SEWER LINE	1	-	-	-	**1**
NETWORK	0	-	-	-	**0**
Total	**636**	**109**	**172**	**23**	**941**

INVESTMENT	Extension in Km	Extension in Km	Extension in Km	Extension in Km	Extension in Km
TRUNK COLLECTOR	22	27	16	4	**69**
OUTFALLS	-	-	6	-	**6**
INTERCEPTION	17	-	3	-	**20**
SEWER LINE	1	-	-	-	**1**
NETWORK	0	-	-	-	**0**
TOTAL	**40.28**	**27.31**	**25.17**	**3.70**	**96.46**

Regarding sewage, investments should total R$941 million in 96 km of network in the cycle.

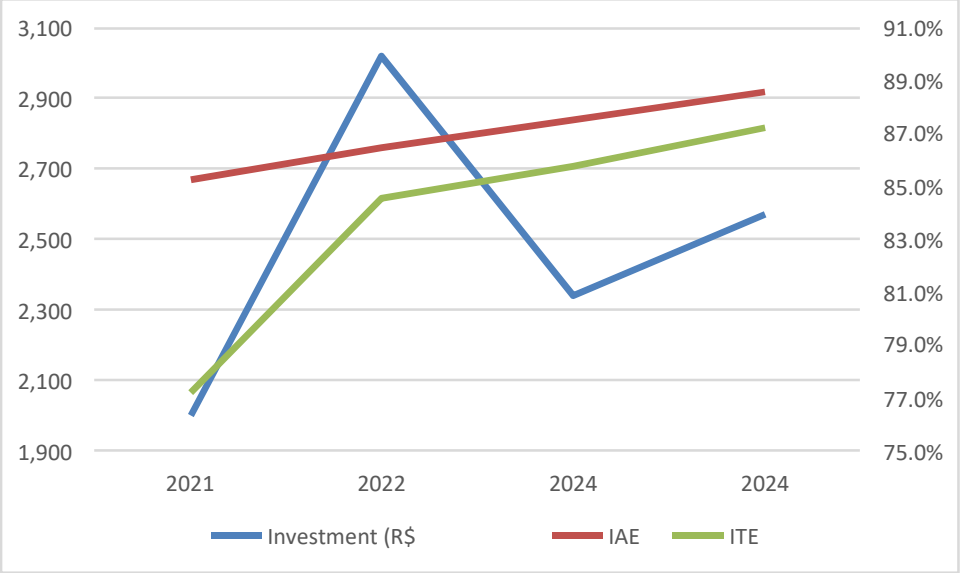
Below is a chart with annual investments in water expansion and the evolution of the water service index.

Chart 1.1: Investment and WSI



Below is a chart with annual investments in sewage expansion and the evolution of the sewage service and treatment index.

Chart 1.2: Investment and IAE and ITE



According to the charts, service, collection and treatment indexes are growing over the cycle, as expected by the investments in the Business Plan.

Regarding the programs included in the Business Plan, the Tietê Project has the highest construction amount of the cycle, accounting for 22% of total capex.

Table 6: Construction – Tietê Project

TIETÊ PROJECT	**4,318,386**
TECHNICAL WORK MONITORING	3,223
TRUNK COLLECTOR (m)	2,475,026
CONSULTING, ADVISORY, ENGINEERING SERVICES	893
SEWAGE ELEVATION (l/s)	120,906
OUTFALLS (m)	41,582
INTERCEPTION (m)	550,897
CONNECTION (un.)	6,052
SEWER LINE (m)	16,286
NETWORK (m)	221,225
TREATMENT (l/s)	882,295

Trunk collector accounts for the highest construction amount (57%), followed by investments in treatment (20%), such as automation system, expansion of sewage treatment stations, among others.

Table 7: Construction – Loss Reduction and Control

LOSS REDUCTION AND CONTROL	**3,683,860**
SYSTEM IMPROVEMENT OR ASSET RENEWAL	3,683,860
TREATED WATER ADDUCTION (m)	89,192
OPERATIONAL SUPPORT	2,808
CONSULTING, ADVISORY, ENGINEERING SERVICES	5,995
TECHNOLOGICAL CONTROL	2,080
MANAGEMENT	14,118
WATER METER (un.)	645,283
CONNECTION (un.)	698,784
MACROMEASUREMENT (un.)	39,124
NETWORK (m)	1,725,649
RESERVATION (m3)	63,343
SECTORIZATION (m)	397,484

Next comes the Loss Reduction and Control project, accounting for 19% of total capex. According to Arsesp's evaluation, in spite of the calculation of a more aggressive loss reduction curve than that proposed by Sabesp in its Business Plan, it is not currently necessary to include additional amounts, mainly because of the non-

linearity of the investment/loss level ratio, as usually reinforced by Sabesp.

The amounts actually invested over the cycle, if they exceed the estimates made in the Business Plan and as long as proven prudent, will be adjusted in the next cycle, after validation of the incremental asset report for the 2021-2024 period. If lower, these investments will also be adjusted.

R$1.7 billion will be invested to change 3,446 km over the cycle, R$699 million to change 2.5 million connections and R$645 million to change 3.3 million water meters.

Table 8: Construction – Vegetative Growth

VEGETATIVE GROWTH	**2,934,829**
WATER	**1,262,400**
SYSTEM EXPANSION	1,262,400
WATER METER (un.)	37,502
CONNECTION (un.)	446,355
NETWORK (m)	778,543
SEWAGE	**1,672,430**
SYSTEM EXPANSION	1,672,430
CONNECTION (un.)	626,609
NETWORK (m)	1,045,821

As for vegetative growth, the highest construction work is in the expansion of the sewage network, followed by water network, corresponding to 2,125 km and 2,348 km of network, respectively.

Table 9: Construction – SPMR's Sewage Program

SPMR'S SEWAGE PROGRAM	2,026,372
SYSTEM EXPANSION	1,594,442
TRUNK COLLECTOR (m)	310,484
CONSULTING, ADVISORY, ENGINEERING SERVICES	43,997
SEWAGE ELEVATION (l/s)	86,507
CONNECTION (un.)	178,808
SEWER LINE (m)	30,184
NETWORK (m)	804,859
TREATMENT (l/s)	139,603
SYSTEM IMPROVEMENT OR ASSET RENEWAL	431,930
OPERATIONAL SUPPORT	2,812
TRUNK COLLECTOR (m)	25,819
SEWAGE ELEVATION (l/s)	5,126
CONNECTION (un.)	60,072
SLUDGE AND FINAL DISPOSAL (kg/day)	3,923
NETWORK (m)	142,716
TREATMENT (l/s)	191,462

The network is the main construction work of the SPMR's sewage program, with investments in system expansion or asset improvement/renewal, totaling 660 km of network at R$947.6 million.

Table 10: Construction – Metropolitan Water Program

METROPOLITAN WATER PROGRAM - MWP	**1,132,693**
SYSTEM EXPANSION	619,609
RAW WATER ADDUCTION (m)	83,567
TREATED WATER ADDUCTION (m)	236,864
COLLECTION (l/s)	33,826
CONSULTING, ADVISORY, ENGINEERING SERVICES	6,500
TECHNOLOGICAL CONTROL	1,149
TREATED WATER ELEVATION (l/s)	25,386
MANAGEMENT	7,675
SLUDGE AND FINAL DISPOSAL (kg/day)	261
WATER SOURCE (l/s)	27,876
RESERVATION (m3)	103,179
TREATMENT (l/s)	93,325
SYSTEM IMPROVEMENT OR ASSET RENEWAL	513,084
TREATED WATER ADDUCTION (m)	18,955
OPERATIONAL SUPPORT	48,400
COLLECTION (l/s)	17,364
CONSULTING, ADVISORY, ENGINEERING SERVICES	53,000
RAW WATER ELEVATION (cv)	118,346
TREATED WATER ELEVATION (l/s)	3,344
SLUDGE AND FINAL DISPOSAL (kg/day)	860
WATER SOURCE (l/s)	14,704
NETWORK (m)	41,200
RESERVATION (m3)	972
TREATMENT (l/s)	195,939

Regarding the metropolitan water program, construction works are not concentrated in specific items, the highest of which refers to treated water adduction (21% of total construction works).

Table 11: Investment in Fixed Asset - Onda Limpa Santos Coastal Area

ONDA LIMPA - SANTOS COASTAL AREA	**1,088,530**
SYSTEM EXPANSION	1,054,130
TRUNK COLLECTOR (m)	26,195
CONSULTING, ADVISORY, ENGINEERING SERVICES	3,897
SEWAGE ELEVATION (l/s)	90,712
OUTFALLS (m)	234,049
MANAGEMENT	51,567
CONNECTION (un.)	15,445
SEWER LINE (m)	47,514
NETWORK (m)	189,146
TREATMENT (l/s)	395,605
SYSTEM IMPROVEMENT OR ASSET RENEWAL	34,400
TREATMENT (l/s)	34,400

The objective of the Onda Limpa program is network expansion and sewage treatment, so as to increase the collection index and maintain the collected sewage treatment index.

The highest volume of constructions is in treatment (41% of the total), and involves the expansion and improvements in sewage treatment stations and sewage preconditioning stations.

The above-mentioned investments account for more than 75% of the total investment of the cycle.

EHIBIT II

REGULATORY REMUNERATION BASE

1. CALCULATION OF THE REGULATORY REMUNERATION BASE

Under the ordinary tariff revision process, the methodology and general criteria for updating the Regulatory Remuneration Base are disclosed by Arsesp in a specific resolution. For the 3rd OTR, Arsesp Resolution 941/2019 was published, after Public Consultation 09/2019. This resolution established the conditions for updating the shielded base, validated in the 2nd OTR, and the incremental base, which comprises the assets that came into operation in the incremental period from July 2016 to June 2019.

As determined in NT.F-0043-2020, the procedure for recognition and inclusion of the incremental investment made in the previous cycle in Sabesp's Regulatory Remuneration Base provides that the investment must be the object of an Appraisal Report prepared by a specialized appraisal company, using the Original Book Value (OBV) method for the assets of the incremental base and the New Replacement Value (NRV) method for the assets of new municipalities served by Sabesp in the incremental period. The Report submitted by Sabesp is subject to analysis and validation by Arsesp before being definitely included in the Remuneration Base.

The Regulatory Remuneration Base must also be updated to the reference date of the tariff cycle, adding the assets incorporated (our expected to be incorporated) from July 2019 to December 2020, as well as excluding depreciation, plus inflation adjustment for the period. Additionally, an amount of Working Capital, that is, the funds necessary to finance its operations, is added to the initial remuneration base.

Due to the impacts of public calamity arising from the COVID-19 pandemic, the field activities were limited, affecting the conclusion of valuation and validation of the asset base. Accordingly, the asset report delivered by Sabesp on November 3, 2020, without field inspections, but with the application of all other criteria established in Arsesp Resolution 941/2019, was therefore the alternative adopted.

After the asset valuation report is subject to verification by ARSESP, the compensatory adjustment will be made until the next tariff process (tariff adjustment or revision).

SUMMARY OF THE ASSET REPORT SENT BY SABESP

The chart below shows a summary, based on the non-validated report sent by the concessionaire (October/2020 prices), of the values that will compose the shielded base and the incremental base of the 3rd OTR, net of regulatory depreciation (amounts in thousands of reais), after inclusion of the Santo André asset base and the change of the shielded and incremental bases until December/2020.

SUMMARY	Updated Shielded Base	36,948,496
	Incremental Base	10,276,621
	Total RRB	**47,225,117**
	RRB x1000 (Oct/20)	47,225,116,681
	RRB0 (Oct/2020)	**47,225,116,681**

The values of the assets of Public-Private Partnerships (PPP) and Asset Lease are not considered in the RRB. The values of PPPs and Asset Lease payments were considered as specific lines in the economic-financial model.

ASSETS INCORPORATED AFTER THE ASSET REPORT

To obtain the Initial Net Regulatory Remuneration Base (NRRB 0) to be used in the cash flow, the value of the Appraisal Report considered at June 2019 prices was updated to June/2020, by adding the assets incorporated from July 2019 to June 2020, net of construction margin.

The chart below highlights the breakdown of gross construction costs in RIWCP, administrative cost and construction margin, with deduction of the construction margin for purposes of calculation of RRB, in local currency.

Valor de Aquisição	2.923.745.154
Valor dos Juros sobre Obras em Andamento - JOA	151.985.670
Valor do Custo Administrativo	176.722.675
Valor da Margem de Construção	53.757.556
Valor de Aquisição sem Margem de Construção	**2.869.987.598**

Construction values from July/19 to June/20 were classified as 1 – Treatment stations; 2 – Distribution Networks and Collectors; and 3 – Collection Reservoirs, to be used in the calculation of Regulatory Interest on Construction Works in Progress (RICWP). The result of this classification is shown in the chart below:

investimentos - 2° sem/2019 e 1° sem/2020			
		Investimento	%
1	Estações de Tratamento	410.920.968,88	14%
2	Redes de Distribuição e Coletores	2.084.743.184,91	73%
3	Reservatórios e Captações	9.531.559,54	0%
	Sub-Total	**2.505.195.713,33**	**87%**
	Demais investimentos	364.791.884,36	13%
	Total	**2.869.987.597,69**	**100%**

DEPRECIATION

According to NT.F-0043-2020, the technical depreciation to be considered for changes in the asset base for the next tariff cycle must be obtained through the asset report presented by the Concessionaire, including both the shielded base and the incremental asset base. The asset base of the municipality of Santo André (included in the incremental base) and the reassessment of disallowances of the 1st OTR (included in the shielded base) were also considered. As the figures will be used for changes in the asset base of the next tariff cycle, assets totally depreciated were excluded from the calculation (after changes in the asset base in December/2020).

The technical depreciation rate was calculated by adding the weighted depreciation rate of each asset, weighted by the asset value (OBV or NRV) in relation to the total value of the base.

	OBV / NRV (R$)	Average depreciation rate	Useful life	Average rate
Incremental	15,035,117,230.68	3.31%	30.21	3.31%
Shielded	83,991,481,537.46	2.04%	49.02	2.04%

By weighting the numbers of the shielded and incremental bases by the original book value/new replacement value of each of them, the useful life of the Regulatory Remuneration Base (RRB) and the average depreciation rate, which corresponds to the technical depreciation rate of 2.23%, are obtained:

EHIBIT III

DEF 7 – SABESP'S RRB DISALLOWANCES (1st OTR)

1. INTRODUCTION

According to ARSESP Resolution 941, of December 13, 2019, the Regulatory Remuneration Base (RRB) is composed of the existing operating assets (water supply and sewage services) evaluated and adjusted, less non-costly assets. Sabesp's RRB assets, which are part of the provider's Asset Base Report, are divided into: Land; Structures; Wells; Water and sewage networks; Water meters; Household connections; Others.

In order to consolidate Sabesp's shield asset base for the process of the 3rd Ordinary Tariff Revision (OTR) and revaluate physical disallowances made under the 1st OTR, ARSESP Resolution 981, of April 13, 2020, defined a specific action in its 2020-2021 Regulatory Agenda – *DEF7 "Assessment of reversals made in SABESP's asset base in the 1st Tariff Revision*", expected to be concluded in the second half of 2020.

Sabesp's asset base used in the 1st tariff revision process (concluded in 2014), which will comprise the asset base for purposes of the 3rd OTR, was subject to disallowances that had been adjusted throughout its consolidation. The disallowances and further adjustments still need inquiries, requiring technical analysis for their consolidation.

The purpose of this Technical Report is to present the revaluation of Sabesp's Shielded Base approved on the 1st Ordinary Tariff Revision (1st OTR), exclusively for assets named "Water and Sewage Networks" (Assets UP-08 – Pipelines), where the most significant adjustment was made by ARSESP in the 1st OTR.

Below is a brief history that aims to contextualize the process since the 1st OTR, followed by technical analyses and definitions adopted by ARSESP in this revaluation stage.

2. HISTORY

The first process to define the asset base for the Periodic Tariff Revision was on September 30, 2011, when SABESP presented the physical survey and evaluation of its own assets to determine the regulatory remuneration base.

ARSESP inspected the asset report supported by Ernst & Young Terco Assessoria Empresarial Ltda. (EY), by means of ARSESP agreement/030/01/2012. According to Official Letter DOC - CT 08/1, of February 7, 2014, *"EY's work at the time was to analyze a sample of the assets selected by ARSESP in order to ensure that the methodologies, criteria and calculations complied with the guidelines provided for in resolution 156/2010*".

This work resulted in some points of attention and divergence between the criteria and the methods used in the works presented by SABESP, which were documented by ARSESP with the publication of Resolution 427, of August 1, 2013. After that, SABESP standardized the works and adjusted such points, which resulted in a second report, delivered on December 3, 2013. As a result of this evaluation, adjustments were made in Household Connections, Water Meters, Wells and Other Assets. However, the most significant adjustment was made on Water and Sewage Networks (corresponding to a disallowance of approximately R$6.7 billion). Estimates on the values of cast iron pipelines were also reviewed, once it was reasoned that such pipelines could be replaced by new materials less costly (disallowance corresponding to 15% of the manufacturing cost of the material).

SABESP's 1st OTR was concluded on April 10, 2014. The final result was published on Final Technical Note RTS/004/2014. ARSESP maintained all the disallowances using the values of SABESP's Revised Asset Report and initially disclosed through Technical Note RTS/001/2014, presented for Public Consultation 001/2014.

SABESP presented its contribution in the Public Consultation that preceded the publication of NT-RTS 004/2014, discussing some of the disallowances made by the regulatory agency.

At ARSESP's request, EY produced a new document DOC – CT 09/14, of April 2, 2014, analyzing SABESP's contributions presented in the Public Consultation about Water and Sewage Networks. This new EY Revised Report proposed a revision of the amounts of the Kits initially recognized in the Initial Report (DOC – CT 08/13), and a proposal to increase the values (VBR) of the initially recognized assets. However, the result of EY's Revised Report was not considered by ARSESP in the Final Technical Note RTS/004/2014, and should be incorporated to the 3rd OTR.

In the Final Technical Note RTS/004/2014 of the 1st OTR, ARSESP considered the possibility of reconsidering the reversed values at manufacturing cost of iron pipelines, provided that the provider presented a substantiated study. In May 2017, SABESP presented the "Technical Report on the disallowances made by ARSESP in pipelines in the 1st Tariff Revision", attaching the invoices related to the acquisitions of cast iron in the last few years and examples of *as-built* from projects made in the incremental period of networks that used cast iron. In July 2017, it also presented Technical Note "Analysis on the use of Cast Iron Pipelines and PVC", confirming the information of continuity on the use of iron pipelines.

ARSESP concluded that the information sent by SABESP show that cast iron pipelines could not be replaced by other materials (HDPE or PVC) in all the situations. Thus, ARSESP decided to revise the disallowance of R$980 million (amounts of September/2011) at manufacturing costs of cast iron pipelines of the 1st OTR. This reversal was already considered under the 2nd OTR.

In the second tariff revision cycle, with the purpose of restructuring the analytical base of the 1st OTR, SABESP and ARSESP did a joint work to restructure the adjusted base. This occasion, ARSESP presented new elements that made it possible to technically revise the disallowance made in the provider's network, namely:

- Letter 9 EY – response to SABESP's Contribution/Opinion on the TN;
- EY Kits with adjustments.

In July 2018, ARSESP's and SABESP's technical teams started works to restructure the Analytical Shielded Base. The main adjustments in these items were due to the revision of the disallowance of 15% on Pipeline Manufacturing Costs carried out in the 2nd OTR; and the use of EY's Revised Report (DOC – CT 09/14), instead of the Initial Report (DOC – CT 08/13).

On EY 's Letter 09, the appraisal company declared that:

> Accordingly, with a view to working with lower percentage subjectiveness and in order not to be extremely conservative, EY understood that the application of the average value for all municipalities is the most appropriate solution for the progress of the evaluation. We understand that the services developed in the Metropolitan Region of São Paulo are highly complex, however, it should be considered that in smaller roads, with less traffic, the percentages dedicated to the implementation of signs and preliminary services are significantly lower than the average adopted in the calculations.

Adjustments to water and sewage networks are the only item that ARSESP's technical team considered necessary to reevaluate in view of SABESP's proposal to restructure the Shielded Base.

Thus, SABESP's proposal presenting the technical arguments for new adjustments in Water and Sewage Networks adopted average kits per type of pipeline, material and diameter, and were taken into consideration for all the municipalities.

Despite the reversal of the disallowance of 15% over the manufacturing cast iron costs and the reconsiderations made by ARSESP based on EY's letter CT 09, other items reversed in the 1st OTR still were subject to doubts and claims by SABESP, related to the structure of the construction kits used as reference for definition of pipeline values. These items were the focus of action DEF7 "Assessment of reversals made in SABESP's asset base in the 1st Tariff Revision".

Below are the items that SABESP requests revision, which were reconsidered by ARSESP, as well as the conclusions of the analysis carried out by ARSESP's technical team and the new proposal for restructuring the Analytical Shielded Base, regarding "Water and Sewage Networks' (UP 08).

3. ARSESP'S TECHNICAL ANALYSES AND DEFINITIONS

In order to discuss the assumptions and values adopted in the assessment of water and sewage networks, technical meetings were carried out by ARSESP's team in 2020 for evaluation of the items that would have technical and objective basis to become part of action DEF 7.

As required by ARSESP, on December 9, 2020, SABESP presented a technical note including an analysis of reversals made to networks kits, with a number of technical rationale. It also sent spreadsheets referring to the Water Distribution Network (WDN) and Sewage Collection Network (SCN) kits.

On December 23, 2020, ARSESP requested additional documents from SABESP, which were presented by the provider:

- Work List and Engineering Services Aug11
- Inputs Aug11

Analysis carried out by ARSESP identified points that resulted in the reversals made in the 1st OTR, which could be subject to technical revaluation, as follows:

• Ditch depth

• Ditch width

• Mechanical digging for different depths

• Construction of ballast, slab and bedding for sewage networks

• Manhole (PV) distancing

• Correction in earthmoving calculations

The provider claims that *"during analysis of the assumptions used by the inspection company in the Appraisal Report of SABESP's 1st Tariff Revision Cycle, especially regarding the inspection of water and sewage network kits, some values and prices adopted did not comply with the reality of the concessionaire's water supply and sewage service network construction*", encouraging it to present a technical analysis for each assumption used by the appraiser, with which it disagrees, and shows its technical standing. These arguments were analyzed by ARSESP's technical team and resulted in the definitions below.

To support ARSESP's determinations included in this Technical Report, the following ABNT standards were considered, without prejudice to the other technical bibliographies and the expertise of the Agency's professionals:

NBR 12266/1992 – Project and construction of ditches to lay water, sewage or urban drainage pipelines.

NBR 9649/1986 – Sewage collection network project. NBR

9814/1987 – Construction of sewage collection network.

3.1 Ditch depth

SABESP arguments are that the appraiser, in addition to adopting minimum values defined by the standard, omitted items necessary for the construction of network, hindering the company's kits. It also argues that the total ditch depth should correspond to the sum of the following construction elements: pipeline section, paving, ditch covering, ballast for laying the pipeline, and regularization of the bottom of the ditch (the latter for SNC).

Arsesp's Analysis:

According to NBR 12266, the ditch depth is the "level difference between the bottom of the ditch and the surface of the ground", where:

> Ditch depth must be defined based on the dimensions of the hydraulic project plus the thickness of any elements necessary to support the pipeline.

It is extremely important to correctly determine the ditch depth and its financial impact on the construction of water supply and sewage collection networks, since it impacts other services of the kits, such as earthmoving and definition of the use and type of adequate shoring (in addition to the other variables, such as type of soil, etc.).

ARSESP analyzed each item requested by SABESP to define and/or change the items that comprise the ditch depth[6], and determined that:

DITCH DEPTH = regularization of the bottom of the ditch + ballast + pipeline section + covering

3.1.1 Paving

SABESP claims that the depth of paving removed when opening a ditch must be accounted for in the sum of the items that define the total depth, since

[6] Including paving, if any.

network construction normally occurs in locations already paved, except for construction in unpaved locations. According to the provider:

> In ABNT NBR 12266: Project and construction of ditches to lay water, sewage or urban drainage pipelines - Procedure, the definition of "Ditch depth" (item 3.10) is the "Difference of level between the bottom of the ditch and the ground surface", without explicitly mentioning whether or not it includes paving. However, the same standard (item 3.14) defines "Ditch" as a "Hole in made the soil, by mechanical or manual process, with specific cross section, to insert pipelines". Also, "Ditch Backfill" (item 3.11) is defined as "Soil restoration from the bottom of the ditch to ground surface".
>
> Therefore, even though the inclusion of the paving depth in the total depth is not explicit, based on NBR 12266, it is understood that the ditch depth is composed of the entire layer removed when it is opened. Thus, in paved places (most of SABESP's cases), paving is replaced and makes up the total ditch depth.

SABESP also presented data included in IR - 01/2004 – Instruction for Repairing Flexible Paving Damaged by Opening Ditches, of the municipal government of São Paulo, to justify the inclusion of 0.18m in height for paving (adopting Section Type – Light Traffic, considering layers of hot asphalt concrete – CAUQ, binder, and simple graded gravel). For this reason, SABESP requests that its water and sewage network kits include the thickness of 0.18m referring to paving as an item of the ditch depth.

Arsesp's Analysis:

ARSESP substantiated on the same standards used by the provider to define its position regarding this item. According to NBR 9649, covering is the "difference of level between the ground surface and the external superior line of the sewage collector".

In NBR 9649, ditch backfill is the "soil restoration from the bottom of the ditch to ground surface".

Accordingly, after analyzing the above-mentioned standards, we understand that paving is already included in the total dept of the ditch when the standard refers to ground surface, and it should not be an item to be added.

Also, considering that NBR 12266 defines digging as the "Removal of soil, from the natural surface of the land to the quota specified in the project", ARSESP defined in item "PAVING" kits with thickness of 0.15m, including for those used in SABESP's calculations (LMDM). Note that item "bituminous macadam base for paving (B)" is not always used and, in spite of that, will be maintained by ARSESP.

In view of these definitions, the services composing "Earthmoving" in the kits will be automatically revised.

3.1.2 Ballast

SABESP informs that EY considered the following thicknesses for ballast, based on the type of network (WN/SN), where:

Kits RDA	
Diâmetro	Lastro
≤ 400 mm	0,10 m
400 mm < DN ≤ 700 mm	0,20 m
> 700 mm	0,25 m

Kits RCE	
Diâmetro	Lastro
≤ 700 mm	0,20 m
> 700 mm	0,25 m

Source: SABESP (2020)

SABESP declared that these thicknesses are in accordance with the provider's practice and meet the existing technical recommendations for construction of water and sewage networks, being suitable for all kits, except for the "sewage collection network kit made with ceramic pipe".

According to the provider, for this type of network and material, the specifications of internal regulation and on its Book of Price Regulation and Measurement Criteria, which presents minimum ballast, slab and bedding heights to be applied must be complied with. In this case, the value to be applied in the construction of ceramic sewage networks should be at least 0.35 meters.

Arsesp's Analysis:

It is worth noting that standard NBR 12266 defines ditch bottom as the "lower part of the ditch, on which the pipeline is directly supported or through a proper bedding". It also specifies that the project must indicate the most appropriate ditch bottom preparation, which may be:

a) adjustment of the natural soil;

b) soil replacement;

c) ballast of granular material;

d) simple or reinforced slab;

e) sealing.

NBR 9814 brings recommendations for the "laying of pipeline", considering specific provisions because of the soil of the bottom of the ditch (firm and dry land, on firm land with satisfactory supporting capacity, on compressible and unstable land, and on rocky land), and specific provision due to the type of pipeline (rigid, semi-rigid and flexible pipelines).

Thus, even after evaluation of the recommendations contained in technical standards, EY's Letter 09, and in the drafting of projects and construction of sanitation works, although SABESP's standard requests the adoption of ballast, slab and bedding with 0.35m for ceramic tube in SNC, we do not believe to be prudent the adoption of ballast, slab and bedding with 0.35m of thickness, mainly considering its high cost versus its use in projects and field projects. These projects seldom contain this specification for support of pipeline at the bottom of the ditch, with several options provided for in the standard. Therefore, ARSESP decided to maintain EY's determination for sewage collection networks made with ceramic tube.

Ballast, slab and bedding thicknesses defined by EY were already being considered in concrete SNC, FOFO SNC and PVC SNC kits, as well as ballast thicknesses[7] in WDN kits.

3.1.3 Covering

[7] We adjusted the price numbers and their descriptions (ballast for laying the pipeline) in WDN kits presented by SABESP (LMDM revised kits). The prices were correct.

SABESP claims that the covering value should not be a linear measure, as proposed by ARSESP, but a variable measure based on local conditions, which suffers interferences of pre-existing facilities of other natures in many of the cases.

Arsesp's Analysis:

However, with the above, SABESP agrees with the use of the minimum covering height (1.00 m) in the kits of the 1st Tariff Revision Cycle, in order to comply with the conservative line presented by the inspection company, and also declares that it "considers the minimum covering value of 1.0 m for network construction works in its Book of Technical Specifications, Price Regulation and Measurement Criteria, regardless of the diameter, even that, in most of the works, the covering actually applied on the pipeline is significantly higher than the minimum covering".

3.1.4 Regularization of the bottom of the ditch

SABESP states that this item, which is not considered in the calculation of the ditch depth by the inspection company, must be added for the correct measurement of the total ditch depth. According to SABESP, "the regularization of the bottom of the ditch is essential because of the incline necessary for construction of the sewage network, as provided by in ABNT NBR 9646, which establishes the conditions required in the construction of sewage network projects".

Thus, it also requests that for this item the minimum value estimated in the standard and used by SABESP in its works be considered, correcting the ditch depth adopted by the inspection company.

Arsesp's Analysis:

The minimum decline of the ditches is presented in item 5.1.4 of NBR 9649 – Hydraulic sizing, which is calculated based on the following formula:

$$I_o mín. = 0{,}0055\, Q_i^{-0{,}47} \text{ sendo } I_o mín. \text{ em m/m e } Q_i \text{ em } \ell/s$$

By adopting the minimum values contained in the above-mentioned standard, such as Q_i = 1.5l/s, the minimum incline of 0.5% is obtained. In other words, to comply with the criteria provided for in the technical note, the height defined in the standard of 0.05 meters, or 0.5% of pipeline incline each 1,000m, must be adopted for sewage pipeline.

Also according to NBR 9649:

> The incline of each section of the collection network should not be lower than the minimum acceptable incline calculated according to 5.1.4 nor higher than the maximum incline calculated according to 5.1.5.

Taking into consideration the minimum criteria defined in the standards for hydraulic sizing, we decided to consider the height of the regularization of the bottom of the ditch with thickness of 0.05m in all SCN kits, as this is an essential service carried out in the field in most of the works.

3.2 Ditch width

SABESP stated that, for some water and sewage network kits, the inspection company disregarded the widths adopted by the provider, thus using new values, and that such values do not meet the specific regulatory references for the opening of ditches included in NBR 12266. Accordingly it requests the correction of such values in order to ensure the maintenance of the adoption of conservative values, in addition to compliance with technical specifications, according to the initial proposal of SABESP's network kits.

Arsesp's Analysis:

According to ABNT technical standards:

> The width of the bottom of the ditch must be defined depending on the soil, depth, construction process, diameter of the tube and room necessary to place the joints together (NBR 12266).
>
> The ditch width must be defined based on the characteristics of the soil and the pipes used, depth, type of shoring and digging process (NBR 9814).

NBR 12266 presents two tables containing the ditch widths usually adopted for laying water and sewage pipeline, respectively. Such widths undergo interference depending on three factors: the pipe's nominal diameter, ditch cutting portion and type of shoring of the soil used.

Table 1 - Ditch width for sewage works

Diâmetro nominal	Cota de corte (m)	Largura da vala em função do tipo de escoramento e cota de corte			
		Pontaletes (m)	Contínuo e descontínuo (m)	Especial (m)	Metálico-madeira (m)
100 e 150	0-2	0,65	0,65	0,75	-
	2-4	0,75	0,85	1,05	-
	4-6	0,85	1,05	1,35	-
	6-8	0,95	1,25	1,65	-
200	0-2	0,70	0,70	0,80	-
	2-4	0,80	0,90	1,10	1,75
	4-6	0,90	1,10	1,40	1,90
	6-8	1,00	1,30	1,70	2,05
250 e 300	0-2	0,80	0,80	0,90	-
	2-4	0,90	1,00	1,20	1,85
	4-6	1,00	1,20	1,50	2,00
	6-8	1,10	1,40	1,80	2,15
350 e 400	0-2	0,90	1,10	1,20	-
	2-4	1,00	1,30	1,50	2,15
	4-6	1,10	1,50	1,80	2,30
	6-8	1,20	1,70	2,10	2,45
450	0-2	1,00	1,15	1,25	-
	2-4	1,10	1,35	1,55	2,25
	4-6	1,20	1,55	1,85	2,40
	6-8	1,30	1,75	2,15	2,55
500	0-2	1,10	1,30	1,40	-
	2-4	1,20	1,50	1,70	2,35
	4-6	1,30	1,70	2,00	2,50
	6-8	1,40	1,90	2,30	2,65
600	0-2	1,20	1,40	1,50	-
	2-4	1,30	1,60	1,80	2,45
	4-6	1,40	1,80	2,10	2,60
	6-8	1,50	2,00	2,40	2,75
700	0-2	1,30	1,50	1,60	-
	2-4	1,40	1,70	1,90	2,55
	4-6	1,50	1,90	2,20	2,70
	6-8	1,60	2,10	2,50	2,85
800	0-2	1,40	1,60	1,70	-
	2-4	1,50	1,80	2,00	2,65
	4-6	1,60	2,00	2,30	2,80
	6-8	1,70	2,20	2,60	2,90
900	0-2	1,50	1,70	1,80	-
	2-4	1,60	1,90	2,10	2,75
	4-6	1,70	2,10	2,40	2,90
	6-8	1,80	2,30	2,70	3,05
1000	0-2	1,60	1,80	1,90	-
	2-4	1,70	2,00	2,10	2,85
	4-6	1,80	2,20	2,50	3,00
	6-8	1,90	2,40	2,80	3,15

Source: ABNT (1992)

Table 2 - Ditch width for water works

Diâmetro nominal	Cota de corte (m)	Largura da vala em função do tipo de escoramento e cota de corte			
		Pontaletes (m)	Contínuo e descontínuo (m)	Especial (m)	Metálico-madeira (m)
50 - 75	0 a 2	0,65	0,70	0,80	1,30
100 - 150	> 2	0,75	0,85	0,95	
200	0 a 2	0,70	0,75	0,85	1,35
	> 2	0,80	0,90	1,00	
250	0 a 2	0,75	0,80	0,90	1,40
	> 2	0,85	0,95	1,15	
300	0 a 2	0,80	0,85	0,95	1,45
350	> 2	0,90	1,10	1,20	
400	0 a 2	0,90	1,00	1,10	1,60
450	> 2	1,00	1,20	1,30	
500	0 a 2	1,00	1,15	1,25	1,75
	> 2	1,20	1,30	1,45	
600	0 a 2	1,15	1,25	1,35	1,85
	> 2	1,30	1,45	1,65	
700	0 a 2	1,30	1,50	1,60	2,05
	> 2	1,40	1,70	1,90	
800	0 a 2	1,40	1,60	1,70	2,15
	> 2	1,50	1,80	2,00	
900	> 2	1,60	1,90	2,05	2,25
1000 (A)	> 2	1,70	2,00	2,10	2,35
1000 (B)	> 2	2,00	2,10	2,20	2,40
1200 (A)	> 2				2,40
1200 (B)	> 2				2,60
1500 (B)	> 2				2,85
1800 (B)	> 2				3,15
2100 (B)	> 2				3,45
2500 (B)	> 2				3,90

Source: ABNT (1992)

NBR 12266 emphasized that the characteristics of the ditches must be individually analyzed should it be necessary to use pipeline with diameters different than those described in the tables above.

ARSESP's team analyzed the ditch widths suggested by SABESP in its Technical Note, and in the Engineering Works and Services Prices Bank (3rd edition 2010). They also analyzed the widths defined by EY. In Letter 09, EY highlights that:

> Chapter 4, pages 6-11 of the Manual edited by SABESP presents ditch width dimensions based on the type of paving, pipe diameter and, consequently, ditch depth. EY's calculations for minimum widths and depths meet with the technical specifications defined by SABESP in the above-mentioned Manual. The traceability of the calculations carried out by EY may be verified by analyzing the files that will be made available to ARSESP along with this letter.

Accordingly, we understand that the minimum width recommended by ABNT's technical standards, or presented by SABESP, whichever is lower (minimum of 0.65m for continuous and discontinuous shoring) must be respected. Thus, the ditch widths presented in the WDN and SCN kits were corrected in accordance with tables 1 and 2 above. The above-mentioned tables suggest ditch widths usually used in the laying of pipeline with joints or corrections made in the ditch.

However, as this standard does not present values for networks with diameters over 1000mm; the values adopted for larger diameters were those recommended in standard NBR 9814:

> The free working width in the ditch must be at least equal to the diameter of the collector plus 0.60 m for depths up to 2m, and should be increased by 0.10m for each meter or fraction exceeding 2m.

Considering that the spreadsheets of the WDN and SCN kits present calculations that adopt a range between pipe diameters (such as 1001mm - 1100mm), for pipelines up to 1000mm, ARSESP considered the largest width of the range described in the standard or the largest subsequent diameter, if the standard does not present the exact diameter of the kits. For pipelines of more than 1000mm, the average of the diameter range was considered. The value recommended in item 5.4.6 of standard NBR 9814 was used on this average. Thus, the value considered in the spreadsheets was the result of the application of these definitions or the value presented by SABESP, whichever is lower.

3.3 Mechanical digging for different depths

According to SABESP, the assumption used to prepare its kits was to consider, depending on the ditch depth, the corresponding mechanical digging in its Engineering Works and Services Bank, of October 2011.

In its WDN and SCN kits, SABESP considered "Mechanical digging of ditches in non-rocky soil, with depth up to Xm", whose prices varied according to the ditch depth. ARSESP, however, had considered a single price for this service (code 040636): "Mechanical digging of ditches in non-rocky soil, with depth up to 2.00." SABESP emphasizes the need to revise the appraiser's definition, mainly considering higher costs for digging greater depths.

Arsesp's Analysis:

According to the technical regulations, the project must define the section-type, maximum and minimum values for the width of the ditch and the depth of the ditch, the latter being essential for defining digging services.

According to NBR 12266:

> The width of the bottom of the ditch must be defined depending on the soil, depth, construction process, diameter of the tube and room necessary to place the joints together (*our highlights*).

Also,

> Digging consist of removing soil, from the natural surface of the land to the quota specified in the project.

With regard to digging, the above-mentioned standard states that the complete specifications of the project must suggest or indicate, among others, the methods and equipment to be used. NBR9814 says that "digging can be done manually or with appropriate equipment".

In SABESP's Engineering Works and Services Price Bank – Price Regulation and Measurement Criteria, Group 040600 – Mechanical digging of ditches in non-rocky soil includes 6 different prices for diggings with depths varying from 1.25m to 8.00m, according to table[8] below:

Table 3 - Price regulation

PRICE REGULATION AND MEASUREMENT CRITERIA – SABESP			
PRICE #	**SPECIFICATION**	**UN.**	**PRICE**
040635	MECHANICAL DIGGING OF DITCHES, IN NON-ROCKY SOIL, WITH DEPTH UP TO 1.25 M (B)	M3	4.45
040636	MECHANICAL DIGGING OF DITCHES, IN NON-ROCKY SOIL, WITH DEPTH UP TO 2.00 M (B)	M3	5.00
040637	MECHANICAL DIGGING OF DITCHES, IN NON-ROCKY SOIL, WITH DEPTH UP TO 3.00 M (B)	M3	5.56
040638	MECHANICAL DIGGING OF DITCHES, IN NON-ROCKY SOIL, WITH DEPTH UP TO 4.00 M (B)	M3	6.66
040639	MECHANICAL DIGGING OF DITCHES, IN NON-ROCKY SOIL, WITH DEPTH UP TO 6.00 M (B)	M3	11.03
040640	MECHANICAL DIGGING OF DITCHES, IN NON-ROCKY SOIL, WITH DEPTH UP TO 8.00 M (B)	M3	15.41

Source: SABESP (2011)

8 Comprises digging in non-rocky soil (including boulders – block smaller than or equal to 0.50 cubic meter), including bottom regularization, leveling, finishing and cleaning of the area.

Thus, we understand that the ditch depth should be considered for correctly determining the digging service, by using different prices based on the digging depth and in accordance with the technical project. Also, in view of the changes made by the Agency in item

3.1.1 Paving, it became necessary to adjust the kits spreadsheets to include the price “040635” for “mechanical digging of ditches of up to 1.25m (B)" (SABESP’s OCT/2011 Price Bank). The correct measurement of volumes and corresponding digging prices must reflect, when possible, the technical specifications of the projects, measurement criteria and the reality of the sanitation works.

3.4 Construction of ballast, slab and bedding for sewage networks (SABESP’s Price Bank)

According to SABESP, its SCN kits were made considering the “Ballast, Slab and Bedding for laying”, contained in the Engineering Works and Services Price Bank of the provider, whose unit is the linear meter.

SABESP pointed out that its Price Bank considers renowned cost engineering procedures and fair unit price for the diverse services used in the company’s engineering works, and is also a reference for a number of municipal governments of the São Paulo State and several agencies and sanitation companies. According to the provider, besides consisting in a formalized process internally and externally audited according to the standards of ISO 9001, Brazilian and foreign financing banks, such as the Brazilian Federal Savings Bank – CEF, the Inter-American Development Bank IDB and the International Bank for Reconstruction and Development – IBRD, accept SABESP’s Price Bank in financing projects.

SABESP also presented a comparison between two price tables available in the market – SINAPI (National System of Costs Survey and Indexes of Construction), which is the responsibility of the Brazilian Federal Savings Bank and the Brazilian Institute of Geography and Statistics – IBGE, and the Costs Table of the Secretary of Urban Infrastructure and Construction Works of the Municipality of São Paulo (SIURB).

Arsesp’s Analysis:

This comparison shows that the values adopted by ARSESP are lower than those used in the market, mainly considering that the same value for different pipe diameters were used (for example, for diameters of up to 150 mm to diameter between 601 mm and 700 mm for FOFO SCN and SNC IRON - PVC, HDPE, DEFOFO).

SINAPI's and SIURB's comparative values for "ballast, slab and bedding for sewage networks" services approximate those presented by SABESP in its Price Bank.

Also, the calculations used by ARSESP at the time considered prices whose measurement unit is the cubic meter, thus showing different unit values.

Accordingly, considering that nearly all the services of the kits created in SABESP's 1st tariff revision cycle were prepared based on the Company's Engineering Works and Services Price Bank, we understand that ballast, slab and bedding services for sewage networks follow the same proposal, including by considering the price difference for each pipe diameter.

3.5 Manhole (PV) distancing

In the preparation of its SNC kits, SABESP adopted the maximum distancing of 100m between each manhole, i.e. 10 PV are constructed for each 1,000m of sewage network, stating that it took into consideration SABESP Technical Standard NTS 025 – sewage collection network project and the maximum distancing described by standard NBR 9649.

According to SABESP, network clearing equipment do not reach 100m:

> NTS 025
>
> 4.3.6 Distance between ancillary bodies
>
> The maximum distance between singularities (PV, PI and TL) must be 100m. It is recommended to use distances of up to 80 meters due to maintenance equipment.

In addition, SABESP presented the result of a survey conducted in the company's georeferencing system (SIGNOS), in order to emphasize the use of conservative equipment adopted in its SCN kits, as it observed that the ratio between the number of PI+PV per sewage network extension is 53.07, i.e. 1 manhole for every 53.07m of collector.

Arsesp's Analysis:

According to NBR 9814, "manholes (PV) will be built in the positions indicated in the project, in accordance with NBR 9649".

NBR 9649 defines in "Constructive layouts" that:

> Manholes (PV) must be built at every singular point of the collection network, such as at the beginning of collectors, at changes in direction, incline, diameter and material, where collectors meet and at steps. *(our highlights)*
>
> After ensuring access for equipment to clean downstream stretches, inspection chambers (CP) may be used to replace manholes (PV) in changes of direction, incline, material and diameter, when the removal of step is possible. *(our highlights)*

We understand that it is necessary to meet the requirements of NBR 9649 and the particularities contained in NTS 025 (regarding network clearing equipment), adopting 10 PV for each 1,000m of sewage network.

Even though the standard presents technical situations where manholes may be replaced by Inspection Chambers (CP), Cleaning Terminals (TL) or Inspection and cleaning tubes (TIL), SCN kits have prices for "Masonry manhole for rainwater tunnels, Ø 1 m, depth 2 m - every 100m".

3.6 Correction in earthmoving calculations

According to SABESP's claim, erroneously, the digging volume considered by ARSESP for ditch opening in some kits was only 10% of the total ditch volume, and the kits showed:

- SCN – Ceramic – dimeters above 200mm;
- SCN – Concrete – diameters above 200mm;
- WDN – Ceramic – diameters above 150mm;

According to NBR 12266:

Digging consist of removing soil, from the natural surface of the land to the quota specified in the project.

Arsesp's Analysis:

Although ARSESP has identified that the error in accounting the digging volume of the ditches originated from SABESP's kits, which were partially corrected by EY, we understand that the calculations of the kits that continue considering the digging volume as only 10% of the total volume of the ditch should be adjusted, considering that a network is not built without completely digging the ditch in which it will be inserted.

4. RESULTS

Considering the justifications presented by SABESP, the technical analyses carried out by ARSESP and the determinations contained in this report, adjustments were made to the calculations of the average kits for WDN and SCN (which represent standard project construction modules) in order to check the impact of the new kit values on SABESP's base.

The recalculation of the values of assets referring to Water and Sewage Networks was carried out based on the construction kits presented by SABESP, for each type of pipeline, material and diameter, based on the above-mentioned aspects.

Figure 1 - Revaluation of WDN and SCN Kits

Piping group	Value of the restructured Shielded Base - 2018 - E&Y (R$)	ARSESP Simulation - 2021	Return of Disallowances (R$)
scn_ceramic	R$ 5,165,747,035	R$ 5,887,314,317	R$ 721,567,282
scn_concrete	R$ 582,075,470	R$ 799,059,041	R$ 216,983,571
scn_fofo	R$ 355,245,928	R$ 486,280,971	R$ 131,035,043
scn_pvc	R$ 1,159,698,336	R$ 1,419,018,747	R$ 259,320,411
wdn_ceramic *	R$ 532,362	R$ 532,362	R$ -
wdn_concrete	R$ 249,216,429	R$ 321,964,043	R$ 72,747,614
wdn_fofo	R$ 4,797,795,615	R$ 5,691,031,313	R$ 893,235,698
wdn_pvc	R$ 2,324,207,822	R$ 2,929,019,040	R$ 604,811,217
TOTAL	**R$ 14,634,518,997**	**R$ 17,534,219,833**	**R$ 2,899,700,836**

* Water network values – ceramic (WDN_Ceramic) were not revised, and the original values of the kits defined in the remodeling of the Shielded Base in Jul/2018 were maintained

As shown in the table above, the revaluation of physical disallowances resulted in a difference of **R$2,899,700,836,** at September 2011 prices, which must be depreciated and adjusted to be incorporated in the RRB of SABESP's 3rd OTR and which will not be subject to compensatory adjustment.

It should be noted that the result of this initiative by ARSESP is not intended to correct a material error, but represents a revaluation of technical aspects that made up the construction kits for the pricing of water and sewage pipelines. Thus, the effects of the reconsiderations presented in this report should be observed as of the 3rd OTR, and compensatory adjustments will not be necessary. It is worth noting that this understanding is adopted in other revaluations, such as the utilization indexes of basic sanitation facilities and the reconsideration of 15% of the Manufacturing cost of cast iron pipelines in the 2nd OTR.

5. CONCLUSION

After evaluating the history of the definition of SABESP's asset base in the 1st OTR and the developments based on reversals made in that process, ARSESP decided to include an action in its Regulatory Agenda

for identification of points that might need technical revaluation, mainly based on engineering aspects – physical disallowances (Action DEF 07 of the 2020/2021 Agenda).

The result presented in this technical report was mainly based on objective evaluations, whose reference were technical standards and price bank recognized by the sector.

ARSESP's multidisciplinary technical team chosen for this project is composed of professionals with experience in preparing projects and implementing linear sanitation works, which allowed technical revaluation of items under discussion, based on the technical standards, considering safety and feasibility aspects in the implementation.

The revaluation presented in this report does not aim at correcting material error, which, based on our understanding, did not happen in the reversals made in the 1st OTR, reflecting only technical reconsiderations that result in a new composition of water and sewage network kits.

Based on the technical analysis carried out by ARSESP for assessment of the reversals made on SABESP's asset base in the 1st Tariff Revision, especially for water and sewage networks, we emphasize the importance of the provider developing controls to meet the guidelines contained in Resolution 156/2010 and Resolution 941/2019 – both of which set methodologies and general criteria for the definition and update of SABESP's Regulatory Remuneration Base (1st and 3rd OTRs), respectively.

In spite of the progress made over the last 10 years, SABESP must have controls of its facilities and operational fixed assets to remunerate the existing assets and the costs actually incurred by the company.

The Agency's regulations expect that the provider must have an updated technical record by means of georeferenced maps, in order to properly enable the inspection and analysis of water and sewage networks. In addition to the lack of record, we emphasize additional aspects that make it difficult or impossible by the agency to carry out a specific analysis, such as assumptions and quantitative calculation memories, construction records, geological information, densification and traffic, among others, which are necessary to analyze assets, even if related to a standard project, in a way that it also allows linking physical data and accounting records.

By means of this technical report, ARSESP presents the latest additional technical adjustments in the revision of values of “Water and Sewage Networks”, and ends the discussions about the reversals made in SABESP’s asset base in the 1st Ordinary Tariff Revision.

EXHIBIT IV

EFFICIENCY SHARING FACTOR - X FACTOR

1. X FACTOR CALCULATION

In NT.F-0043-2020, Arsesp presented the methodology chosen to calculate Sabesp's productivity gains, to be used as operating cost reducers over the tariff cycle. The methodology will be the same as that of the 2nd OTR, considering that the matter will be widely discussed over the next tariff revision, by means of an action of Arsesp's Regulatory Agenda.

The first step in determining efficiency gains involves the calculation of an efficiency threshold for the sanitation market. Then, the distance from Sabesp to the defined efficiency threshold was calculated through a Data Envelopment Analysis (DEA) model. The construction of DEA was based on the model presented by Peter Bogetoft and Lars Otto, which was identified as an input-oriented model and included Brazilian water supply and sewage services with regional coverage (state-owned companies) in the sample. The data was obtained with SNIS and considered the average value of the 2016-2019 figures. Accordingly, 26 remarks were included. The final model took into consideration:

- Input: Operating Costs and Losses (l/connection/day);
- Products: Water Connections; Sewage Connections; Water Units; Sewage Units; Volume of Water Measured; Volume of Sewage Collected; Volume of Sewage Treated;
- Non-Decreasing Returns to Scale.

According to what was used in the previous cycle, Arsesp made adjustments to efficiency score biases obtained by the model. The main reason is the evidence that the results obtained by the model are positively biased. The bias-free threshold is then calculated, as proposed by Simar and Wilson. Finally, the results are normalized by the maximum efficiency level obtained in the bootstrap simulations. The programming used to calculate the X Factor and the databases used are attached to this report.

SANEAGO	100%	DEPASA	69%
COPASA	100%	COSANPA	65%
EMBASA	100%	CAESA	62%
COMPESA	97%	SANESUL	61%
CAGECE	97%	CAGEPA	58%
CESAN	96%	CORSAN	57%
CEDAE	93%	CAERN	53%
COPANOR	91%	CASAN	48%
SABESP	**91%**	DESO	46%
SANEPAR	87%	AGESPISA	46%
CAERN	87%	CAEMA	45%
SANEATINS	85%	CAESB	41%
CASAL	73%	CAERN	31%

Models to correct environmental variables were tested by means of a Tobit model, but no significant results were found.

Sabesp's inefficiency is 9.3%. The proposed methodology shows a distance reduction of 75% to the threshold over the cycle, which would result in average reduction of operating costs of 1.7% p.a. Note that, as mentioned in previous sections, Sabesp's operating costs were reversed by 8.5%. Therefore, Arsesp understands that it is reasonable to continue not applying this item of the X Factor, as made in previous processes, since the proposed reversals would be sufficient to bring Sabesp closer to the required efficiency.

Finally the expected changes for the threshold over the next cycle should be calculated. The X Factor would be the result of the sum of the inefficiency reduction item and threshold changes. Since it was defined that the efficiency reduction item would be disregarded, the X Factor is equal to the change expected for the threshold.

The Malmquist Index decomposition method is used to calculate threshold changes, based on the algorithm proposed by Simar and Wilson. Thus, it is possible to obtain the portion of technological efficiency gains (threshold changes). To determine the annual threshold change, the average variation from 2016-2019 is considered for the data sample used in the calculation of DEA. The value obtained for each company is weighted by the number of average connections in the same period, thus obtaining a threshold of 0.71% p.a.

For the model of the 3rd OTR, considering the efficiency adjustments made to the personnel line, Arsesp will use a productivity gain factor only in the other OPEX items (general supplies, treatment supplies, electricity, outsourced services and others), which will be reduced by 0.71% p.a.

The methodology of the X Factor to be considered for the purposes of sharing productivity with consumers is presented in Technical Note NT.F-0003-2018. Put simply, it means recalculating P0 considering efficient operating costs and defining the reducing value to the applied in the Tariff Adjustment Index, according to the formula below.

$$\frac{\sum_{t=1}^{4} P_0 ef * V_t}{(1 + r_{wacc})^t} = \frac{\sum_{t=1}^{4} P_0 * (1 - X)^{t-1} * V_t}{(1 + r_{wacc})^t}$$

Onde:

P0 ef = Tarifa Média Máxima (Preço Máximo) eficiente que assegura o equilíbrio da Sabesp considerando os ganhos de eficiência no OPEX estabelecidos para o ciclo tarifário.

P0 = Tarifa Média Máxima para assegurar o equilíbrio da Sabesp, supondo que o nível de eficiência inicial se mantém constante durante todo o ciclo tarifário.

Vt = Volume faturável total para o ano t (corresponde à soma do volume de água e volume de esgoto)

rwacc = WACC da Sabesp determinado para o ciclo tarifário.

X = Fator X a ser determinado para o ciclo tarifário.

The considered cash flow is as follows:

Breakdown	Items of Formula	Present Value	Tariff Cycle			
		2020	2021	2022	2023	2024
Billed Volume (A+E) - (1000m3)	FV		3,422,540,409	3,499,840,263	3,577,804,333	3,654,257,752
(+) Direct Required Revenue -> Tariff	DRR	58,895,327,637	17,275,287,121	17,665,458,459	18,058,982,431	18,444,881,384
(+) Alternative Revenues	AR	493,251,819	149,270,351	149,270,351	149,270,351	149,270,351
(-) Operating Expenses -> OPEX	OPEX	21,204,929,881	6,303,465,853	6,405,018,026	6,465,505,969	6,522,646,761
(-) PPP and Asset Lease	PPP	2,074,250,463	651,547,646	651,853,485	652,162,792	542,989,448
(-) Municipal Funds	MFS	1,491,470,111	437,480,789	447,361,520	457,327,153	467,099,690
(-) Use of Water Resources	UWR	288,030,450	87,165,227	87,165,227	87,165,227	87,165,227
(-) R&D&I	RDI	29,447,664	8,637,644	8,832,729	9,029,491	9,222,441
(-) Income tax/Social contribution	IRCS	8,972,855,943	2,650,387,563	2,685,115,159	2,732,647,286	2,814,332,263
(-) Irrecoverable Revenues	RINC	829,897,116	243,426,967	248,924,891	254,470,058	259,907,780
(-) Investments in Fixed Assets	CAPEX	16,894,589,695	4,561,255,853	5,379,987,180	4,941,654,197	5,682,040,589
(-) Regulatory Interest on Construction Works in Progress	RICWP	620,596,167	154,386,129	212,503,479	173,938,948	216,164,674
(-) Working Capital Variation	WkVar	335,681,276	269,220,996	35,917,263	41,317,674	31,694,760
(-) Initial Capital Base	BRL0	55,893,196,455	-	-	-	-
(+) Final Capital Base	BRLT	49,246,365,766	-	-	-	67,259,435,685
= Free Cash Flow + Bdk		-55,893,196,455	2,057,582,807	1,652,049,852	2,393,033,987	69,220,323,788
= Free Cash Flow + Bdk (Discounted)		-55,893,196,455	1,903,323,300	1,413,623,095	1,894,150,976	50,682,099,084

Net Present Value = -

Internal Rate of Return (IRR) = 8.10%

Calculate P0

Calculate X

Maximum Average Tariff - P0 (R$/m3)	
Calculated	
X	0.2142

	2021	2022	2023	2024
Efficient Revenue	15,980,137,654	15,115,948,251	14,294,171,910	13,505,069,823
Revenue w/o Efficiency	16,029,174,522	15,129,850,645	14,276,667,567	13,459,634,902
Dif	0.00			

Accordingly, the X Factor to be considered for the 2021-2024 tariff cycle is **0.2236%.** This value will be used as a reducer of inflation in the calculation of the Annual Tariff Adjustment Index.

2. SCRIPT FOR CALCULATION OF PRODUCTIVITY GAINS IN R

ROUTINE R FOR CALCULATION OF EFFICIENCY BORDERS - EFFICIENT OPERATING COSTS

BASIC ROUTINE TO CARRY OUT ESTIMATES BY DATA SHIELDING ANALYSIS

rm(list=ls(all=TRUE)) # Cleans R data #

Opening of necessary packages

library(Benchmarking)

library(readxl)

library(mvtnorm)

```
setwd("C:/…/DEA_OPEX")

base_dados <- read_excel("C:/…/DEA_OPEX/BASE_FATORX.xlsx")

# defines inputs and outputs

x <- as.matrix(base_dados[,c("DEX","PERDAS")])

y <- as.matrix(base_dados[,c("LIGACOES_AG","LIGACOES_ESG","ECON_AG","ECON_ESG",
"VOL_MED_AG","VOL_ESG_COL","VOL_ESG_TRAT")])

# Calculates DEA

base_dados$DEA <- dea(X=x, Y=y, RTS="irs", ORIENTATION="in")$eff

## Distortion correction with the Simar & Wilson algorithm

dea_model_ub <- dea.boot(X=x, Y=y, NREP = 2000, EFF = NULL, RTS="irs")

base_dados$DEA_Unbiased <- dea_model_ub$eff.bc

base_dados$DEA_Final <- base_dados$DEA_Unbiased/max(base_dados$DEA_Unbiased)

write.csv(base_dados, "resultado_dea.csv")

# ## Calculation of the Malmquist index

base_dados_malm <- read_excel("C:/…/DEA_OPEX/SNIS.xlsx")

x.t1 <- subset(base_dados_malm, ANO == 2019, select=c("DEX","PERDAS"))

y.t1 <- subset(base_dados_malm, ANO == 2019,
select=c("LIGACOES_AG","LIGACOES_ESG","ECON_AG","ECON_ESG","VOL_MED_AG","VOL_ESG_COL","VO
L_ESG_TRAT"))

x.t0 <- subset(base_dados_malm, ANO == 2016, select=c("DEX","PERDAS"))

y.t0 <- subset(base_dados_malm, ANO == 2016,
select=c("LIGACOES_AG","LIGACOES_ESG","ECON_AG","ECON_ESG","VOL_MED_AG","VOL_ESG_COL","VO
L_ESG_TRAT"))

x.t1 <- as.matrix(x.t1)

y.t1 <- as.matrix(y.t1)

x.t0 <- as.matrix(x.t0)

y.t0 <- as.matrix(y.t0)

Dt0_t0 <- 1/dea(X=x.t0, Y=y.t0, RTS="irs", ORIENTATION="in")$eff

Dt1_t1 <- 1/dea(X=x.t1, Y=y.t1, RTS="irs", ORIENTATION="in")$eff

Dt1_t0 <- 1/dea(X=x.t1 ,Y=y.t1, RTS="irs", ORIENTATION="in", XREF=x.t0, YREF=y.t0)$eff
```

```
Dt0_t1 <- 1/dea(X=x.t0 ,Y=y.t0, RTS="irs", ORIENTATION="in", XREF=x.t1, YREF=y.t1)$eff

Eff.change <- Dt1_t1/Dt0_t0

Tech.change <- sqrt( ((Dt1_t0/Dt1_t1)*(Dt0_t0/Dt0_t1)) )

Malmquist <- Eff.change * Tech.change

base_dados$Malmquist <- Malmquist

base_dados$Eff.change <- Eff.change

base_dados$Tech.change <- Tech.change

write.csv(base_dados, "resultado_malm.csv")
```