

# PPP Public Lighting Porto Alegre - RS



Consortium



ALBINO ADVOGADOS ASSOCIADOS



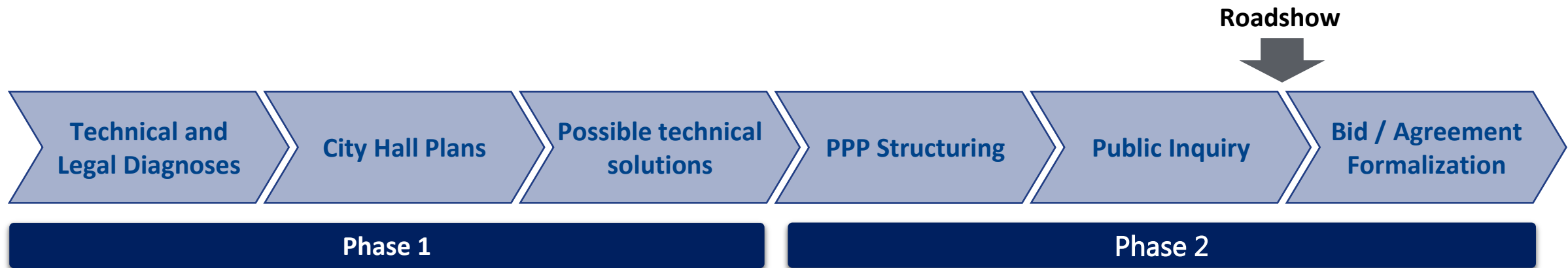
## 1. Project Overview and Modeling

## 2. Financial Analyses

## 3. PPP Call for Bid

## 4. PPP Agreement

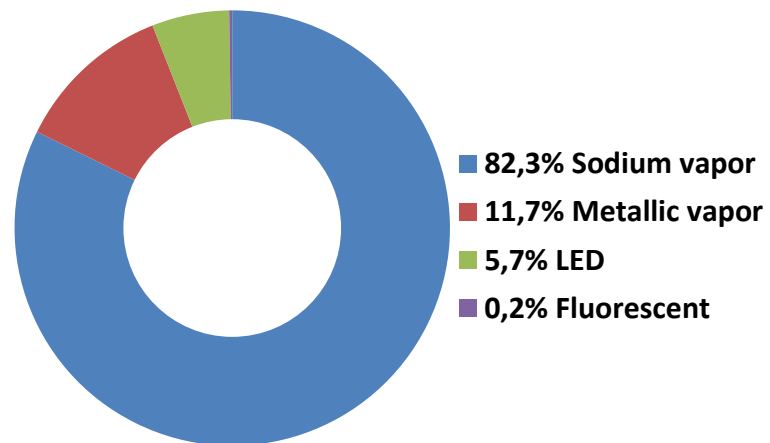
- The National Bank of Economic and Social Development – BNDES, upon technical support by Consortium Houer, RSI Engenharia, Albino and Maciel Rocha, assisted Porto Alegre in structuring this Public Lighting PPP.
- In the first phase, several studies were carried out, such as: diagnostic of the current public lighting park in Porto Alegre, available technological solutions, reference solution (not binding) and reference planning and budget.



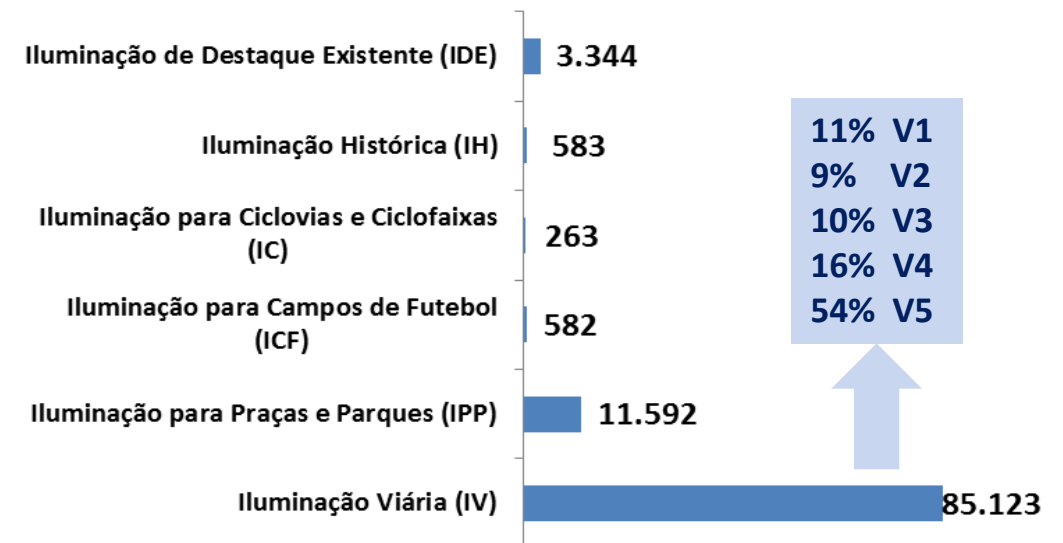
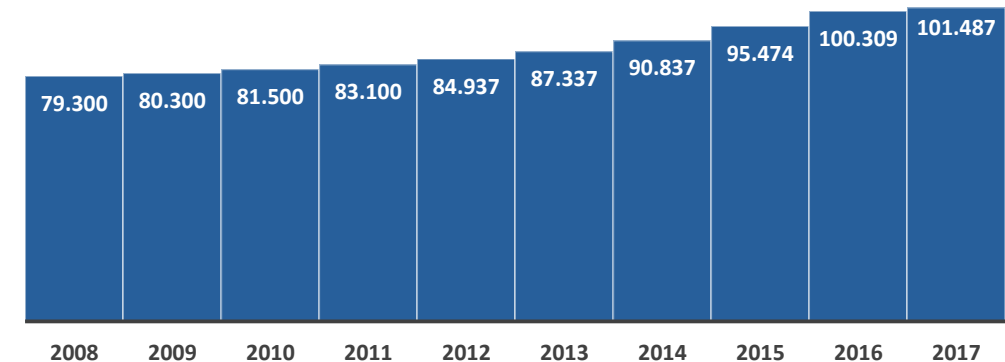
- Then, the concession was modeled: elaboration of the call for bid, concession contract and its respective annexes - contract specifications. The laws and the decrees necessary for the project were approved.
- The result are the reference studies used as a base for the elaboration of the Call for Bid of PPP: (i) Grid Diagnosis; (ii) Environmental Report; (iii) Engineering Report; (iv) Highlighted Illumination Plan; (v) Investment and Operation Plan; (vi) Economic-Financial Evaluation; and (vii) Reference Business Plan.

Number of points	101.5 thousand points
City area	496.7 km <sup>2</sup> area
Extension of the streets	~ 2.2 thousand km streets
Bike paths and bike lanes	48 km
Squares, Parks and Sports Equipment	645
Cultural Assets for Highlighted Illumination	56
Historical Posts	393

Distribution of the Points by Technology



History of expansion of the public lighting park (2008 -2017)



**85.6%**

Aerial distribution grid

**100%**

Photoelectric relay control

**12%**

Exclusive PL poles

**15.5%**

Annual average failure rate  
(lamp, relay and reactor)

**9**

Transformers

**6**

Substations

**0.33%**

Annual vandalism rate  
for lights

**0.09%**

Annual collision rate

**16.5 MW**

Installed Load

**70 GWH**

Annual consumption

**R\$27 million**

Annual power cost 2018

**R\$ 59.6 million**

Collection CIP 2018

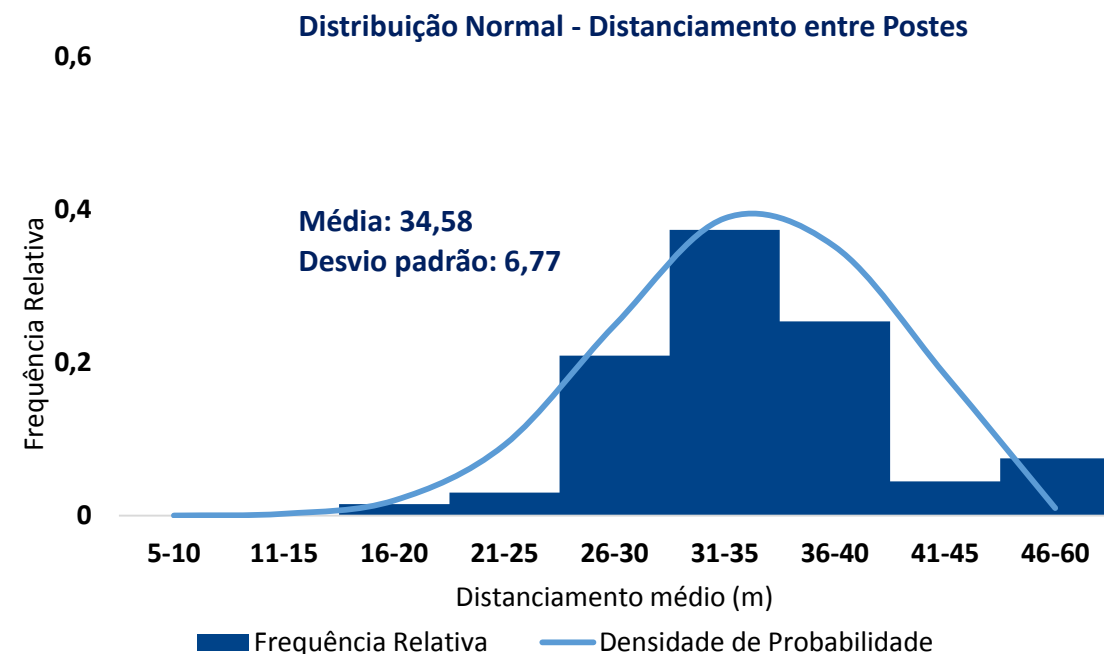
## Compliance with ABNT NBR 5101



Average Illuminance Fulfillment



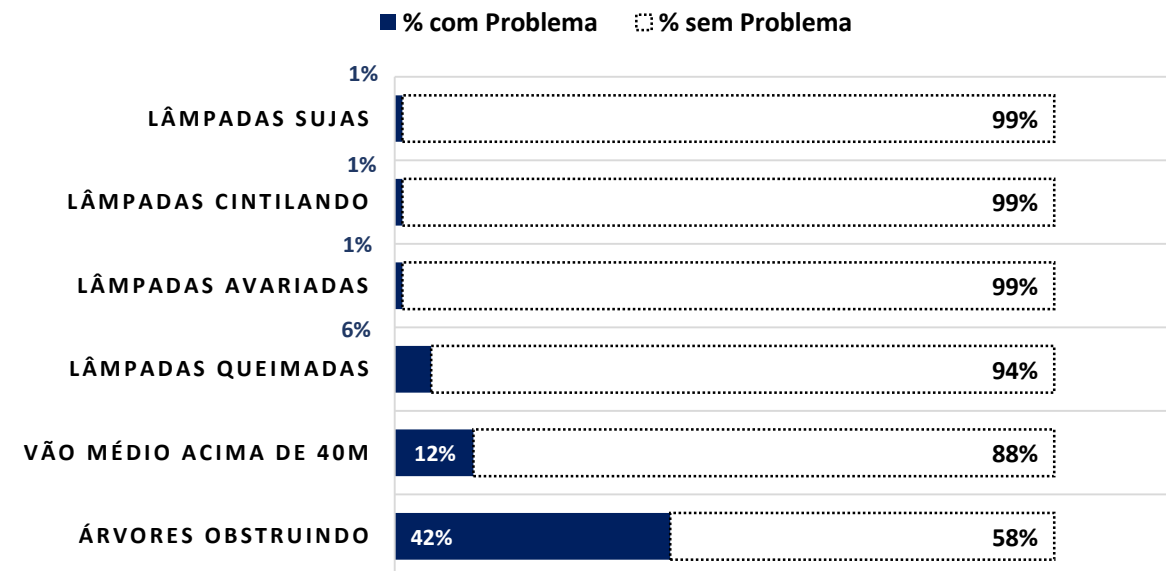
Uniformity Factor Fulfillment

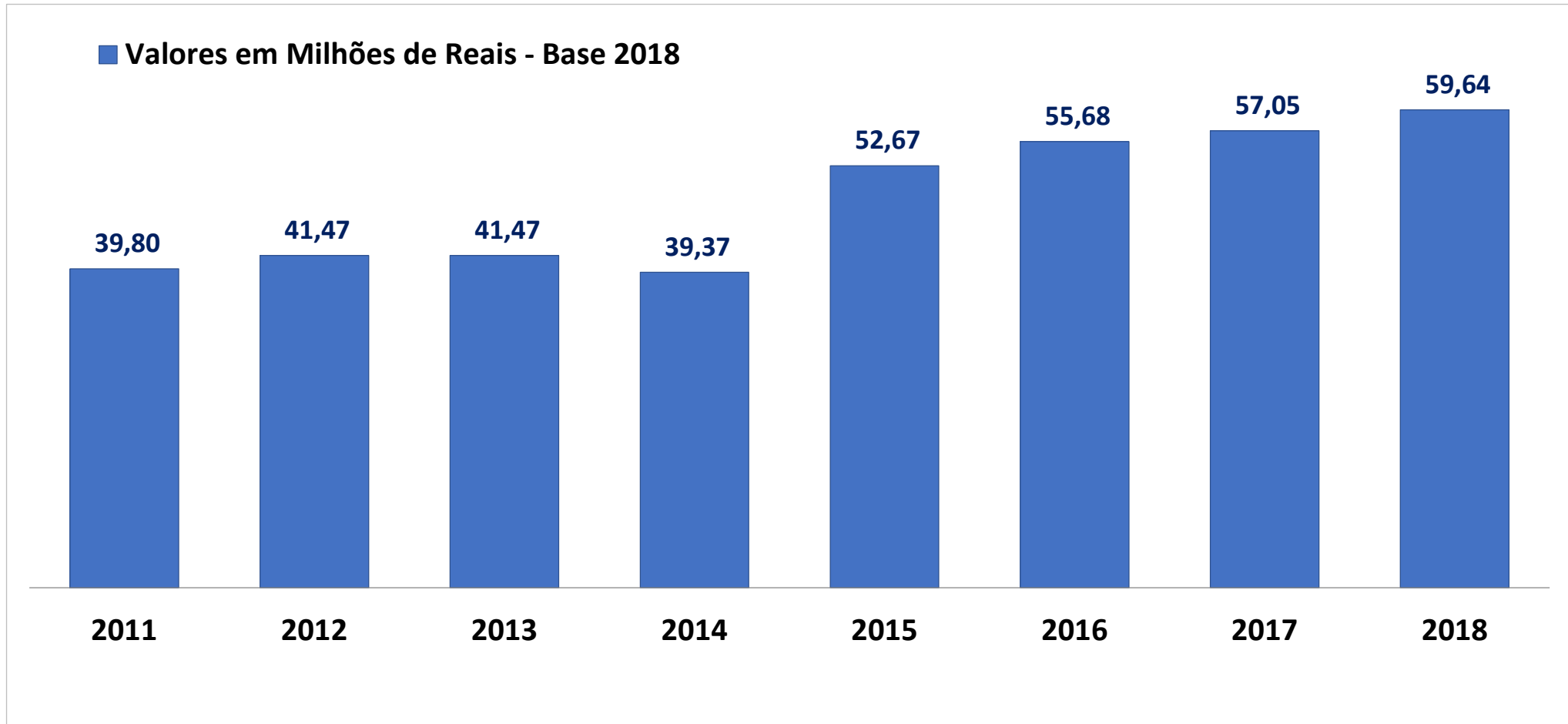


## Assessed Parameters:

- ✓ Average Illuminance and Uniformity Factor (normative requirements);
- ✓ Color reproduction and color temperature index;
- ✓ Street geometry;
- ✓ Disposition and conditions of posts, arms and lights.

## POTENTIAL MOTIVATORS OF NON-COMPLIANCE WITH THE NORMATIVE CRITERIA IN NBR 5101





Collection 2018	R\$ 59.6 million
Estimation considered in the studies	R\$ 58.8 Million (base date 2018)





- ✓ **Modernization** of the Public Lighting park with re-adaptation to the parameters in NBR 5101 aggregating **energetic efficiency upgrade** of the grid
- ✓ **Highlighted Illumination** - creation of 5 Touristic Routes for highlighted illumination on monuments, façades and gardens and modernization of the existing highlighted illumination.

Route 1 - Civic and Religious Circuit

Route 2 - Cultural Circuit

Route 3 - Commercial and Administrative Circuit

Route 4 - Gasometer Circuit

Route 5 - Farroupilha Park (Redemption Park)

- ✓ Increase of the **lighting of public squares, parks and sports equipment;**
- ✓ Special treatment of bike paths, bike lanes and streets of buildings with night public service (Schools, police departments, Hospitals, etc.)
- ✓ Presentation of **better luminotechnical indexes** and active and proactive provision of the services offered to the population in the city.
- ✓ **Tele-management** of streets V1 and V2 and Highlighted Illumination
- ✓ Operational Control Center (**OCC**) mirrored in the City Hall for control
- ✓ Potential development of New Services / Smart City



## Route 1: Civic and Religious Circuit 13 monuments



Pinacotheca Rubem Berta



Legislative Assembly of the State of RS



The Câmara's Manor



Piratini Palace



Metropolitan Cathedral



São Pedro Theater

## Route 2: Cultural Circuit 13 monuments



Customs Square



MARGS – Art Museum of Rio Grande do Sul



Banco Safra



Port Wharf Gate



Santander Cultural Building



Former Customs Building

## Route 3: Commercial and Administrative Circuit 5 monuments



The Azoreans' Palace



Talavera Fountain at the Montevideo Square



Intendente José Montaury Building



Central Public Market



Lodge at Praça XV

## Route 4: Gasometer Circuit 9 monuments



Gasometer Plant



Drum - Monument of the Negro Culture



Church Nossa Senhora das Dores



Correio do Povo Newspaper



Hipólito José da Costa Museum



House of Culture Mario Quintana



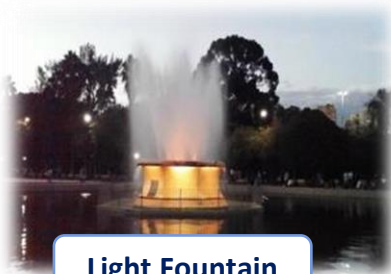
## Route 5: Route Farroupilha Park (Redemption Park) 9 monuments



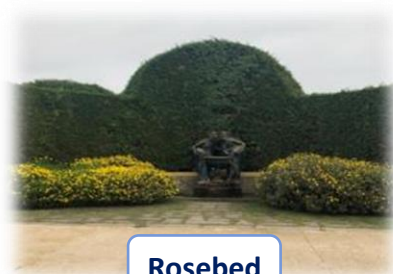
Oriental Garden



Francesca Fountain



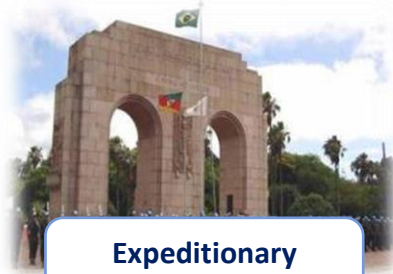
Light Fountain



Rosebed



General Education Institute  
Flores da Cunha



Expeditionary  
Monument

## Current Highlighted Illumination



The Azoreans'  
Monument



Lassoer's  
Monument



Guaíba River Bank\*



Pinheiro Borda Overpass

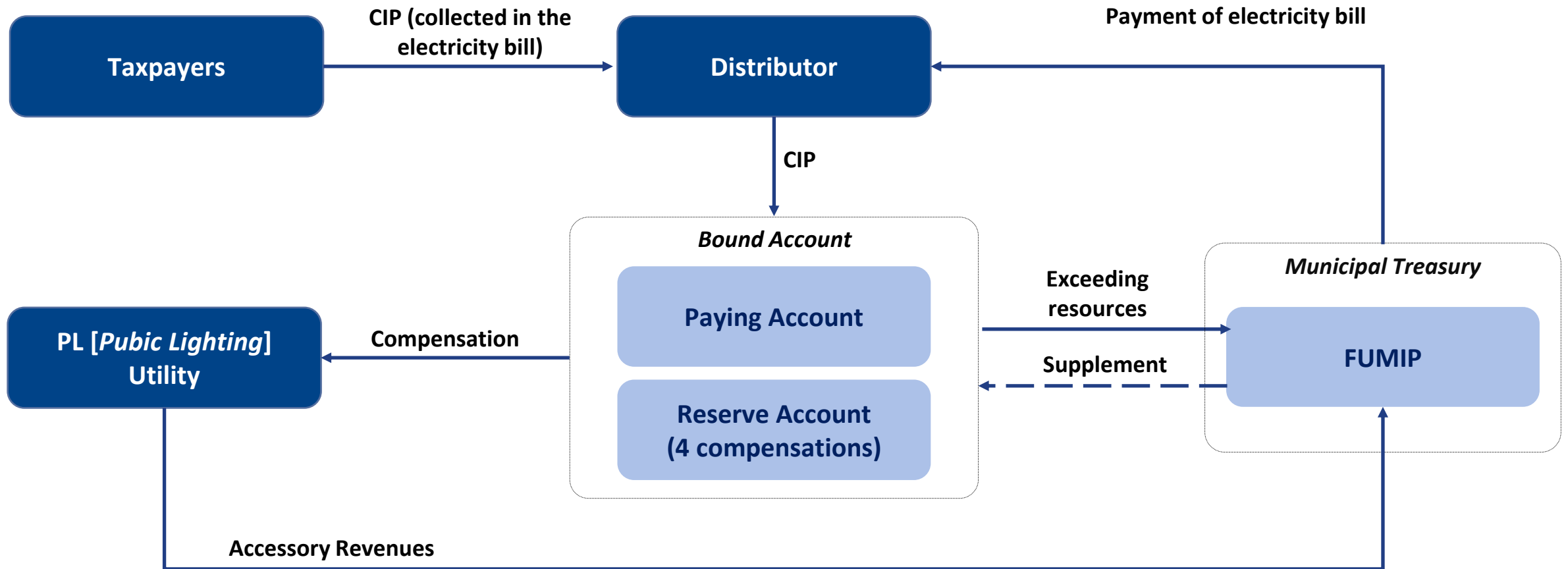
\* Replacement and maintenance only

## Amendment of Municipal Law nº 9.875/05

Increase of the limit of commitment of the **Net Current Revenues to 5%** in PPPs

## Complementary Law nº 840, dated December 27, 2018.

- ✓ Authorization to contract PPP to provide public lighting services
- ✓ **Binding** the revenues of CIP to PPP
- ✓ **Authorization to transfer CIP fully** to the bound account
- ✓ **Authorization** for the CIP **binding** to be done through contract, upon contracting a **financial institution**.
- ✓ Change in the calculation base of **CIP indexing an aliquot as a multiplication factor of the energy rate B4a**
- ✓ Designation of the electric power distributor as **taxation responsible**
- ✓ Maintenance of the current billing mechanism by means of electricity bill
- ✓ **The resources can be unbound only after the amounts enter FUMIP**
- ✓ Provision of the work of an **independent entity** to verify the performance of PPP



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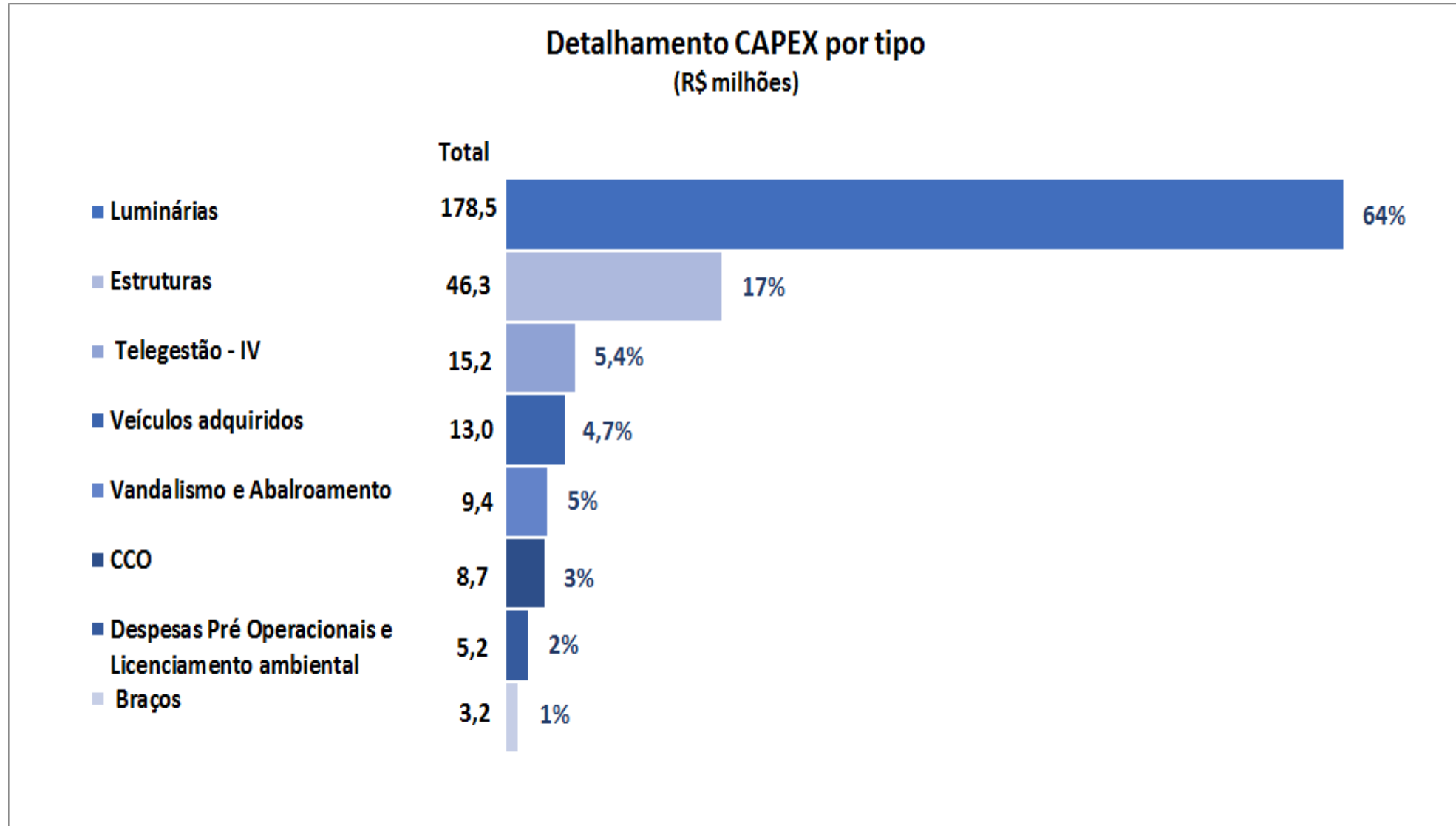
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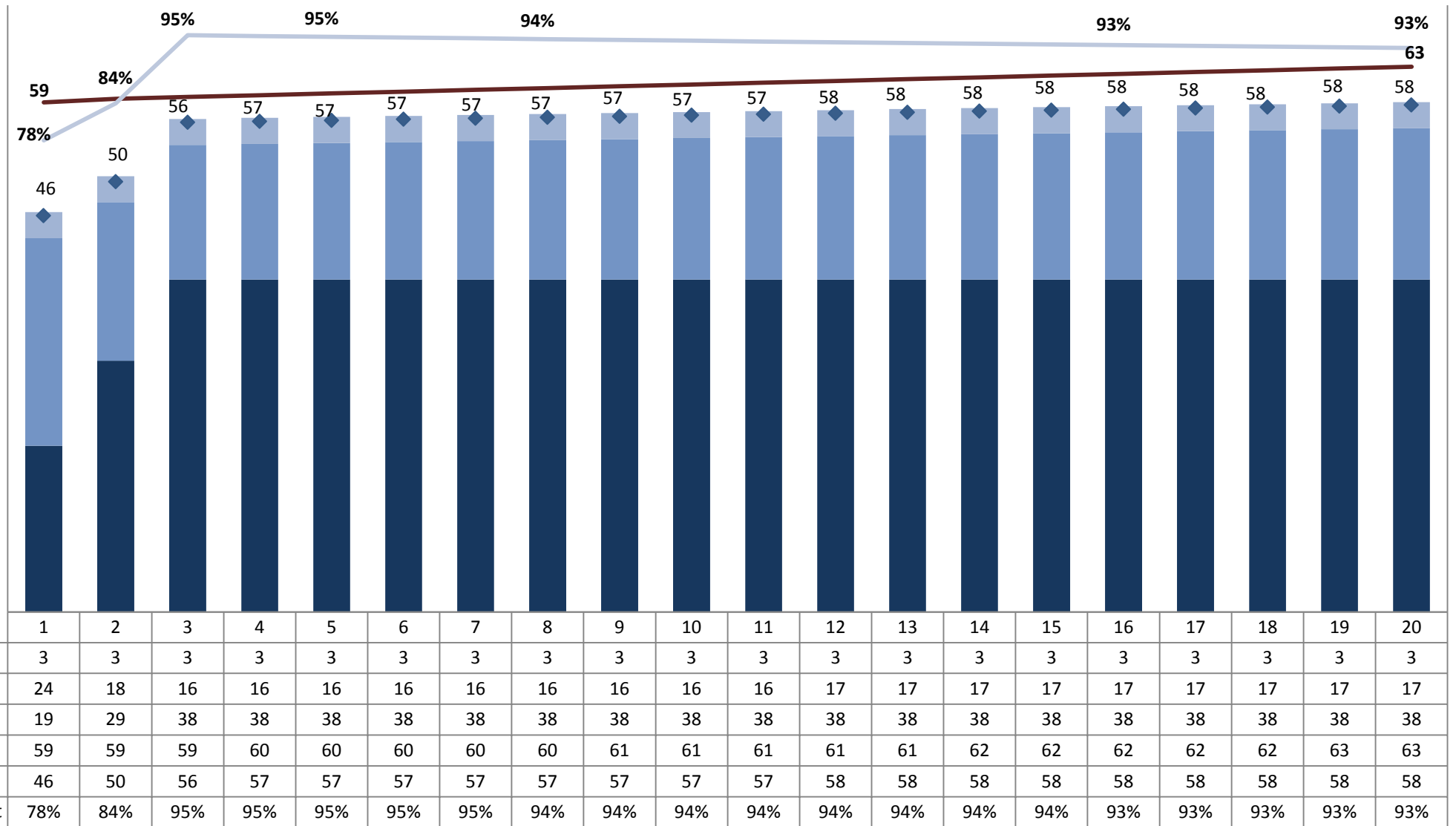
amount in constant currency	
Concession Period	20 years
Contract Amount	R\$ 741.5 million
Modernization Period	24 months after enforcement of the contract
Maximum Compensation	R\$ 3.21 million a month
Capital Cost (WACC)	9.58% real a.y.
Investments 1st Cycle	R\$ 134 million in the first 2 years of concession
Reinvestment	R\$ 145 million in the rest of the concession
Operational Costs	R\$ 6.8 million recurring cost per year (average)
Accessory services	Prior approval of the Business plan by the City Hall and share of the revenues between the City Hall and PPP

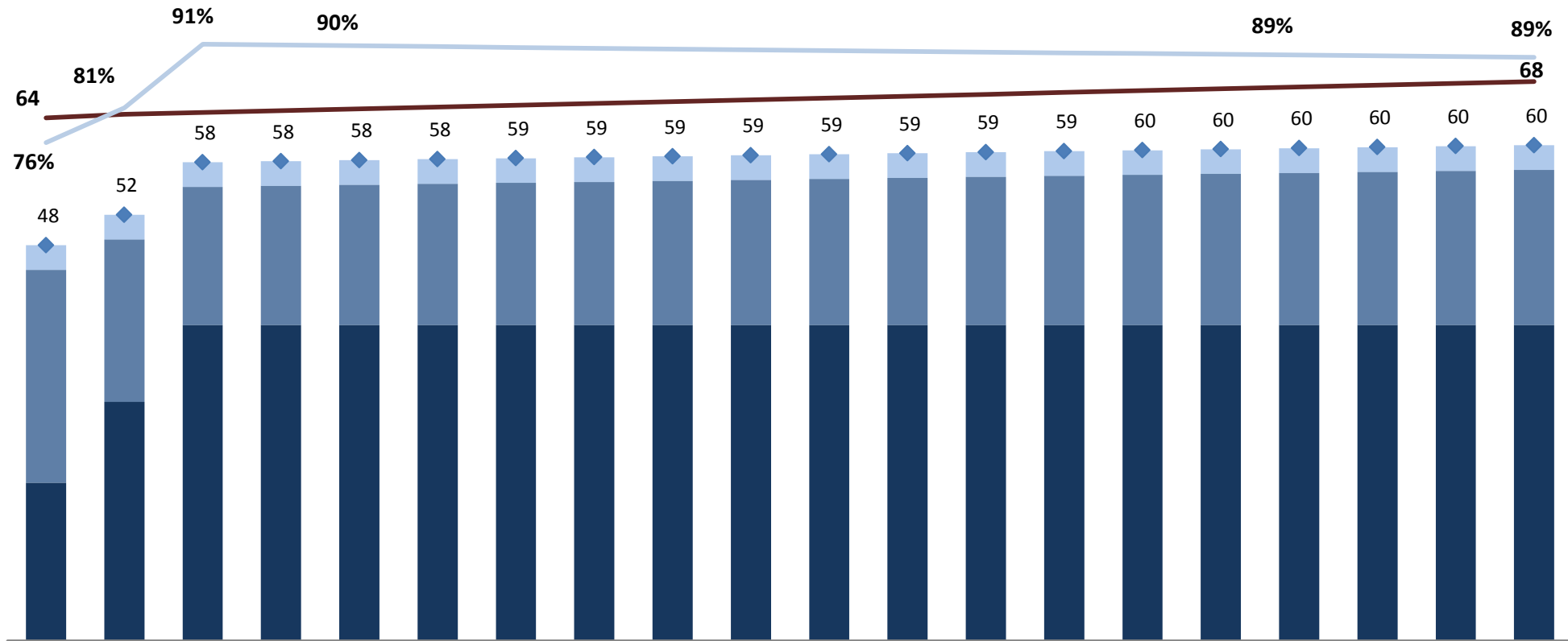




## OPEX details by type (R\$ million)

	Ano 1	Ano 3+
Support Team/OCC team and Utilities	4.59	2.37
Maintenance (Field)	4.00	1.47
Independent Verifier and/ or Financial Agent	0.10	0.10
Data Transmission	0.17	0.36
Call Center (Service Desk)	0.30	0.13
SPE	1.94	1.64
Insurance	1.11	0.29
Bonds	0.26	0.11
<b>OPEX / point (R\$)</b>	<b>123</b>	<b>64</b>





	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VI + Billing Oper	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Energy Consumption	26	20	17	17	17	17	17	17	18	18	18	18	18	18	18	18	18	19	19	19
Compensation	19	29	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
◆ Total	48	52	58	58	58	58	59	59	59	59	59	59	59	59	60	60	60	60	60	60
— CIP Planned Value	64	64	64	64	65	65	65	65	65	66	66	66	66	67	67	67	67	67	68	68
— % CIP Commitment	76%	81%	91%	90%	90%	90%	90%	90%	90%	90%	90%	90%	89%	89%	89%	89%	89%	89%	89%	89%

## Current park

13% of the park meets the criteria in NBR 5101

Predominant low-power sodium lamps

Average IRC 30; yellowish aspect

Frequent dark spots

Annual consumption: 70 GW/year



## Modernized and Efficiency-Upgraded Park

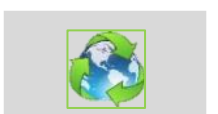
Performance parameters comply with NBR 5101

Adaptation of the power to the consumption reduction by 45.8%

Average IRC  $\geq 70$ ; natural colors

Elimination / big reduction of dark spots

Consumption at 37.9 GWh/year





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## Object of PPP

Delegation of public lighting service provision in the Municipality of Porto Alegre by means of administrative concession, including **implementation, installation, recovery, modernization, improvement, efficiency upgrade, expansion, operation and maintenance.**

## Conditions for Participation

**National legal entities or foreign companies authorize to work in Brazil**, including complementary social security entities, financial institutions and investment funds, alone or in consortium.

**Prohibition** for participation of companies, which have been contracted by BNDES for elaboration of studies or legal entities, which are technically, commercially, economically or financially bound to these companies related to the studies that have been used as a base for the preparation of the Call for Bid.

## Technical Qualification (1/2)

**Financial Structuring:** realization of infrastructure enterprise with investments of at least **R\$ 112 million**. The sum of proving documents will be admitted, provided that the minimum investment by proving documents shall be **R\$ 56 million**.

## Technical Qualification (2/2)

**Operational:** provision of operation and preventive and corrective maintenance services of **at least 40 thousand public lighting points** for the period of at least 1 (one) year, including contract responsibility for the supply of materials and specific equipment, such as lights, lamps, arms and supports for installation, projectors, connectors, conductors, reactors, photoelectric relays and sockets for photoelectric relays. The sum of proving documents will be admitted, provided that the minimum quantity by proving documents shall be **20 thousand public lighting points**.

**Professional:** to have a professional in their staff with higher education degree and holding the following technical responsibility certificates: (i) Execution of civil works and services for implementation, operation and maintenance of public lighting points; (ii) elaboration of Electrical Projects for aerial and underground circuits of squares, monuments and/or avenues; (iii) elaboration of Luminotechnical projects of squares, monuments and/or avenues including presentation of infographics

## Other requirements

Proposal bond: **R\$ 7.4 million**; (1% of the Contract Amount: R\$ 741.50 million);  
Certificate of clearance for bankruptcy and judicial recovery request;  
Proof of taxation and labor regularity.

<p><b>Bidding Performance</b></p>	<p>Brasil, Bolsa, Balcão - <b>B3 (signed contract)</b></p>
<p><b>Criterion of Judgment and Proposed Enforceability</b></p>	<p>Lowest amount of the maximum monthly compensation (<b>ceiling R\$ 3.21 million</b>);</p> <p>Realization of the open outcry stage for the best proposals (limited to 20% difference from the 1st place)</p> <p>Letter from a national or foreign Financial Institution.</p>
<p><b>Conditions of the Concessionaire for the signature of the contract</b></p>	<p>Within 30 days from approval, which can be extended once for equal period:</p> <ul style="list-style-type: none"> <li>✓ Proof of constitution of SPE situated in Porto Alegre.</li> <li>✓ <b>Subscription</b> of the capital stock of SPE <b>at the amount of at least R\$ 40.5 million and pay-ff</b> of the capital in reais at an amount equivalent to at least <b>50%</b> of the subscribed amount;</li> <li>✓ Constitution of performance bond of the Contract (<b>R\$ 37 million</b> 5% of the estimated contract amount);</li> <li>✓ Receipt for payment to BNDES for the performance of studies related to the object of Concession and to B3 for the performance of the auction;</li> </ul>

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<b>Concession Period</b>	<b>20 years.</b>
<b>Remuneration of the utility</b>	<p>Compensation adjusted annually by IPCA and bound to the fulfillment of the milestones for modernization, efficiency upgrade and performance targets.</p> <p>From the achievements of the milestones, CP will be increased until reaching the level of maximum monthly CP offered within the scope of the bid.</p> <p>Furthermore, CP will be proportional to the Performance Factor measures along the entire period of PPP (at least 80%).</p>
<b>Electricity bill</b>	<p>The City Hall will be responsible for the electricity bill and the payment to CEEE.</p> <p>The Concessionaire will be entitled with the right to a bonus on the electricity bill, in case it generates extra savings in the energy consumption, considering that it shall share part of this result with the City Hall.</p>
<b>Contributions</b>	<p>No contributions by the Granting Authority.</p>
<b>Guarantees - Reserve Account</b>	<p>Deposit of <b>50%</b> of the amount corresponding to <b>4 (four)</b> maximum monthly <b>compensations</b> as a condition to start Phase I of PPP. Deposit of other <b>50% to start Phase II.</b></p>
<b>Independent Verifier (IV)</b>	<p>IV will provide support to the inspection by the Granting Authority of the process of remuneration of the Concessionaire, technical analysis of re-balance requests, among other obligations.</p> <p>The City Hall will be responsible to hire IV.</p>



<p><b>Contract reviews</b></p>	<p><b>Ordinary Review:</b> review of the Strategic Plan, technological innovations, guidelines on handling information and the specifications and technical parameters of the Concession</p> <p><b>Extraordinary Review:</b> extraordinary events according to the allocations of risk through <b>Marginal Cash Flow</b></p>
<p><b>Contract performance bond</b></p>	<p>From signature until 120 days after the expiry of the contract term: <b>up to R\$ 37 million. (5% of the contract amount)</b></p>
<p><b>Pay-off of the Capital Stock of SPE</b></p>	<p>Obligation to pay the capital stock off: 50% for signature and the 50% left as condition to start Phase II, totaling R\$ 40.5 million.</p>
<p><b>Insurances</b></p>	<p>Engineering risk insurance</p> <p>Nominated risk insurance (fire, explosion, lightning, accidents, electrical damages)</p> <p>Civil Liability insurance</p>
<p><b>Reversible Assets</b></p>	<p>All assets necessary for the provision and the continuity of the services shall be reverted at the end of the Concession, already cleared from any lien or charge</p>
<p><b>Accessory Revenues</b></p>	<p>Possibility to explore accessory activities private after approval of a Business Plan by the Public Authority, sharing the revenues at proportion of up to 15% of the Gross Revenues with the Public Authority.</p>
<p><b>Resolution of Controversy</b></p>	<p>Technical Committee</p> <p>Arbitration Chamber</p>

## Registration of the PL Grid

- ✓ Re-counting and characterization of PL points
- ✓ Street classification
- ✓ Measurement of energetic consumption with CEEE

## OCC Implementation

- ✓ Service Center (call center and Internet)
- ✓ Operation management and tele-management
- ✓ Project management
- ✓ Management of the electricity consumption
- ✓ Performance management
- ✓ Asset management
- ✓ Availability of mirror OCC for the city hall

## Operation and maintenance

- ✓ Predictive, preventive and immediate corrective maintenance
- ✓ Deadlines for attending impact remuneration
- ✓ Full Operation of the Park, including points of private investment.

## Modernization and Efficiency Upgrade

- ✓ Luminotechnical re-adaptation
- ✓ Reduction of Energetic Consumption

## Highlighted illumination

- ✓ 5 Touristic Circuits
- ✓ Valuation of the Cultural Property and the living areas

## Tele-management System

- ✓ Implementation on streets with higher flow (V1 and V2) and the touristic routes.

## Material Management

- ✓ Disposal of materials
- ✓ Management of the quality and the suitability of the materials

## Expansion of the grid

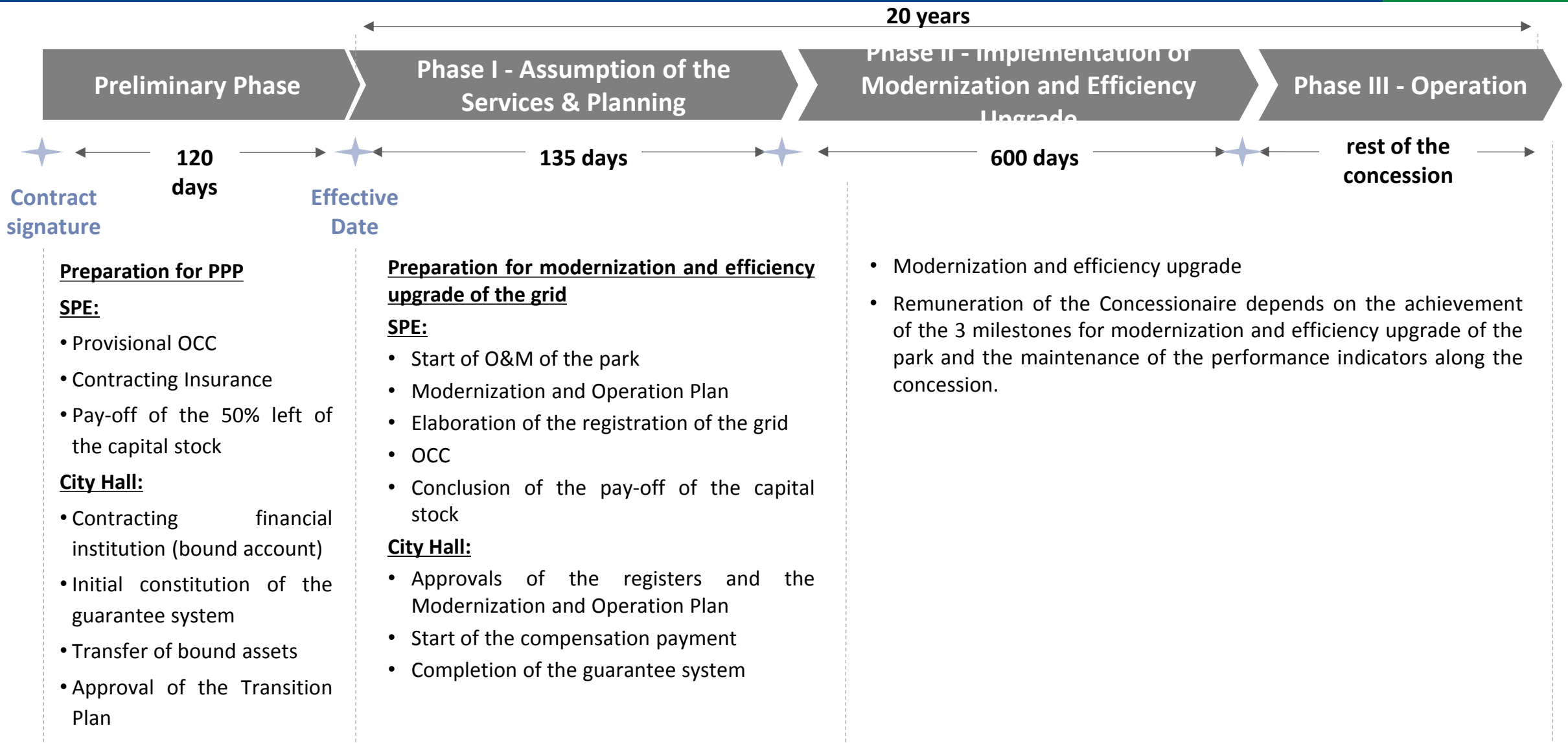
- ✓ Mechanism of the credit bank for new streets and street extension
- ✓ Vertical growth in the ordinary scope of the contract

<p><b>Credit bank</b></p>	<ul style="list-style-type: none"> <li>✓ It represents a credit for request of the City Hall to what refers to implementation and operation of new Public lighting points under given conditions.</li> <li>✓ On the contract effective date, it is started with 1,400 credits.</li> <li>✓ On each anniversary of the contract effective date, 1,400 credits more are added to the pre-existing balance.</li> <li>✓ The credits do not expire.</li> </ul>
<p><b>Horizontal Growth of the City</b></p>	<p>Pre-defined expansion projects and streets that have been expanded, extended or created after the beginning of the Concession</p>
<p><b>Receiving of points for Operation and Maintenance</b></p>	<p>Points installed by entrepreneurs</p>
<p><b>Prompt discretionary demands</b></p>	<p>Reallocation and extraordinary demands</p>
<p><b>They do not consume credits from the bank</b></p>	<ul style="list-style-type: none"> <li>✓ Repressed Demand: expansion due to lack of infrastructure in existing public streets.</li> <li>✓ Elimination of Dark Points: adaptation of the infrastructure to meet the performance parameters.</li> <li>✓ Vertical Vegetation Growth: adaptation because of change of the street class over the contract term.</li> </ul>

Based on CAPEX and OPEX estimations in the Reference Business Plan, each type of request / type of street consumes given number of credits, according to the table below:

Type of Demand	Number of Credits		
	<i>EXPANSION Structure</i>	<i>If Streets V1 and V2*</i>	<i>If Streets V3, V4, V5, Squares and Parks, Bike Paths</i>
PL points in new public locations and expanded public locations. Adaptation by PUBLIC LIGHTING POINT installed by ENTREPRENEURS	Arm tip	2.21	1.00
	Aerial distribution grid	4.94	3.73
	Exclusive underground distribution grid	8.24	7.03
New placement	-	3.15	3.15
Extraordinary demand	Complementary Lighting	2.21	1.00
Incorporation of 100 points for O&M	-	3.11	1.30

(\*) Sidewalks with analogue classification: V1-P1, V2-P2, V3-P3, V4-P4 and V5-P4



In the calculation of the Effective Monthly Compensation (CME), the maximum value of the compensation (CM\_MAX) is considered, multiplied by the efficiency upgrade and modernization factor of the PL park (FME) and the performance factor of the concessionaire (FDG).

$$CME = CM\_MAX * FDG * FME + \text{Bonus for energy savings}$$

<b>CME</b>	Amount of the Effective Monthly Compensation of the Concessionaire
<b>CM_MAX</b>	Amount of the Maximum Monthly Compensation defined by contract between the Granting Authority and the Winning bidder (auction value).
<b>FDG (General Performance Factor)</b>	A factor related to the performance of the concessionaire, which is related to the Performance Measurement System (SMD). <b><math>0.8 \leq FDG \leq 1</math></b> .
<b>FME (Modernization and Efficiency Upgrade Factor )</b>	a factor for adjustment of the compensation for achievement of the Concession milestones. <b><math>0.5 \leq FME \leq 1</math></b> .
<b>Bonus</b>	The total revenues may also be impacted by the BCE index, which corresponds to extra reduction in the energy consumption as of the 3rd Milestone.

There are 3 pillars in the payment system:

## Implementation Milestones

3 milestones with objective dates and parameters, which aim at modernization (adaptation) and efficiency upgrade of the park.

Thus, correspondence between the performance of the private in the execution of the investments versus its due remuneration is assured.

## Performance Index

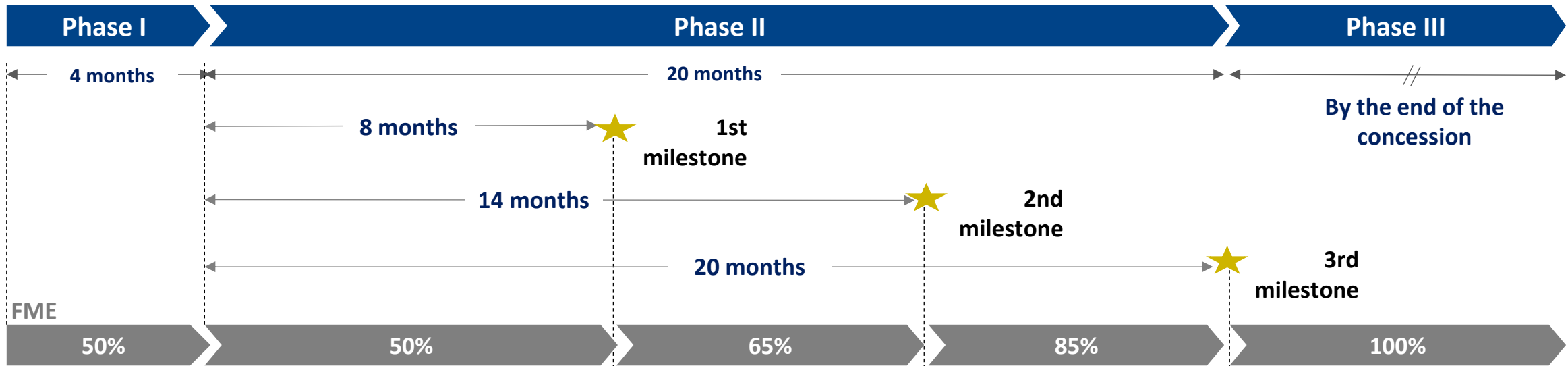
The Performance Index evaluates, for example:

- a) The level of suitability of the lighting;
- b) The level of efficiency through reduction of the energy consumption;
- c) The quality of the operation and the service to the population.

## Bonus

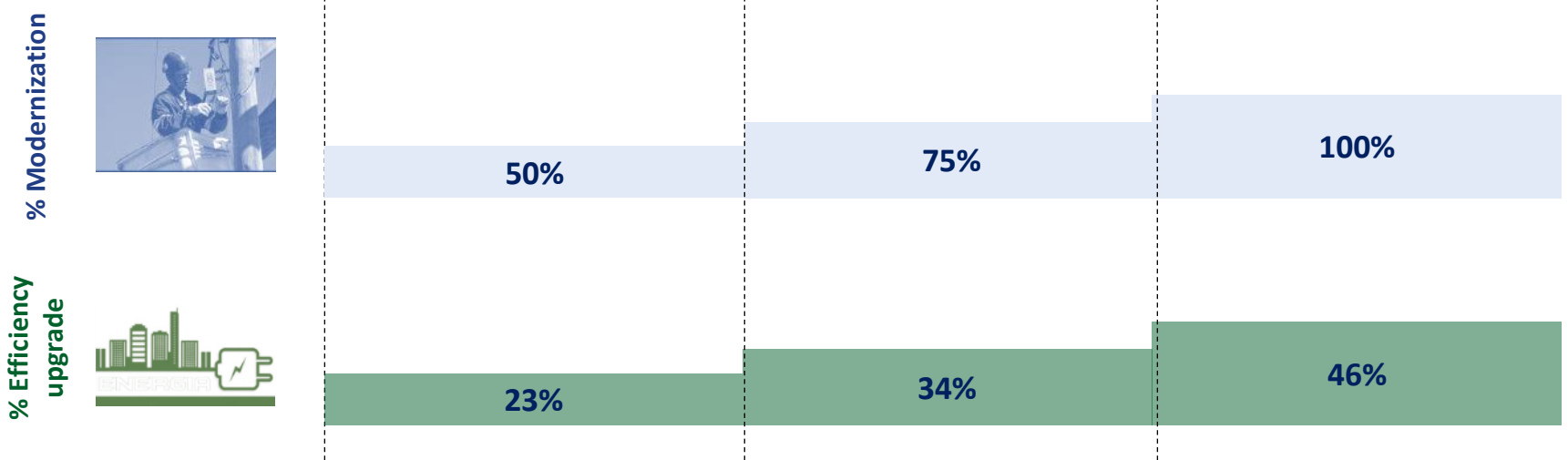
Exceptional performance of the private partner in reducing the energy consumption is shared with the city hall, assuring:

- a) Alignment of the incentive for the private partner to try to increase its operational efficiency and adopt the best technologies continuously.
- b) The possibility of the city hall to use part of the benefits pursuant to the exceptional performance of the grid, the technological evolution of the equipment and the progress in the sector regulation as well.

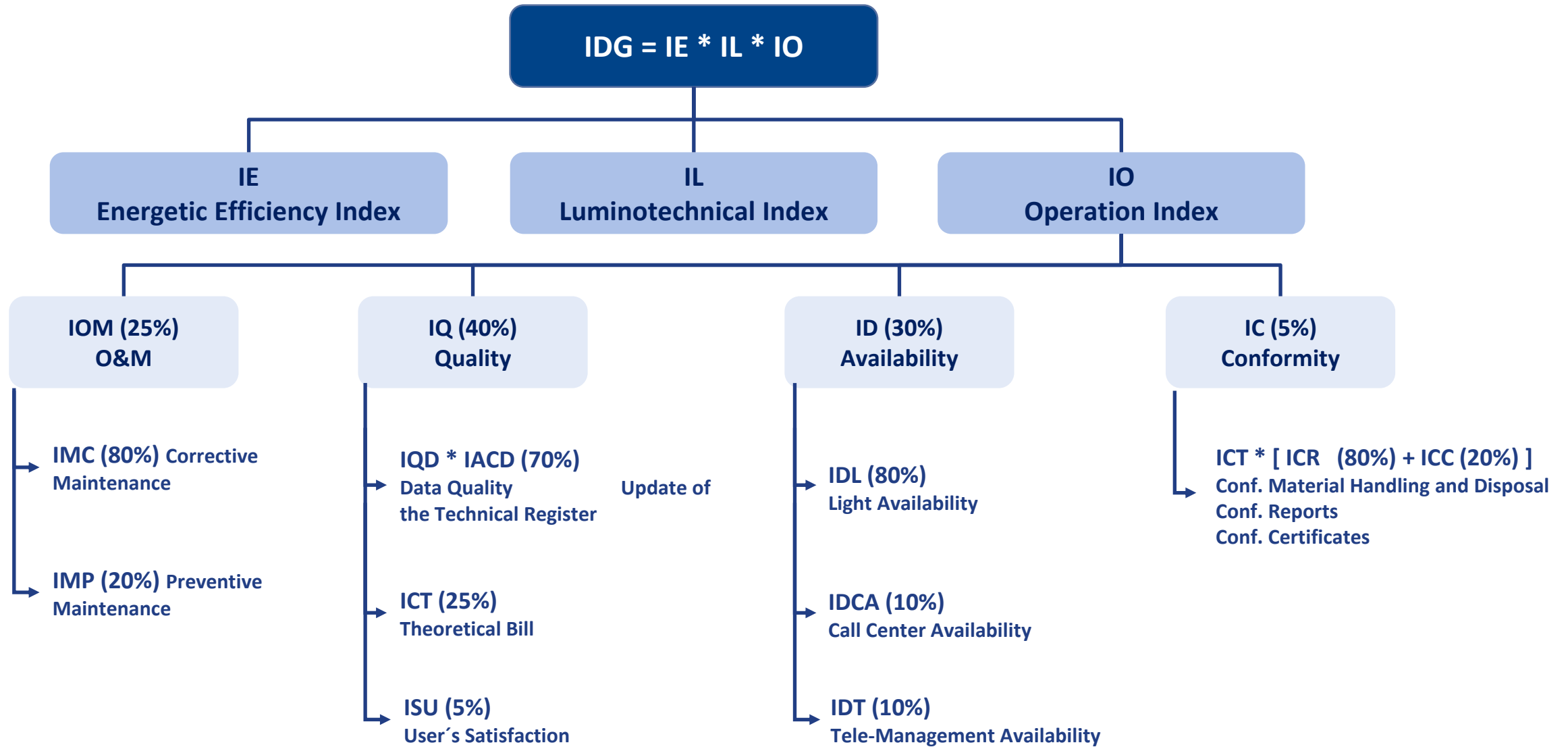


**Implementation Order**  
 1. Streets V1 and V2  
 2. Streets V3, V4 and V5

In addition to the efficiency upgrade and modernization milestones, 1 touristic circuit shall be implemented until the 1st milestone, 3 touristic circuits until the 3rd milestone and in the 3rd milestone, the 5 touristic circuits in addition to the tele-management system.







## Energetic Efficiency Index

It monitors the maintenance of the minimum levels of energetic efficiency upgrade achieved in the Public Lighting park during the entire period of the Contract.

## Luminotechnical Index

It assesses the quality of the Public lighting service provided by PPP for all locations under two luminotechnical requirements. average Illuminance and uniformity factor, considering that for vehicle streets classified as V1, V2 and V3, average luminance and global luminance uniformity shall also be assessed.

**Luminance:** how much light is reflected by a surface; this is what provide sensation of clarity in the environment.

**Illuminance:** this is volume of light falling upon given surface.

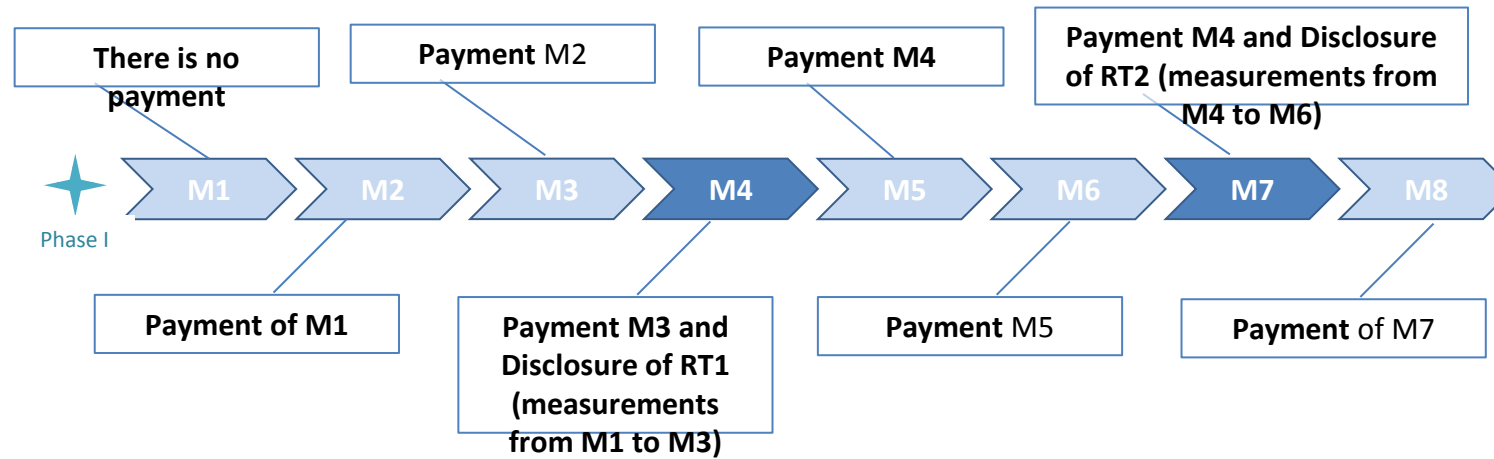
**Uniformity:** it is defined as the ratio between the minimum and average value of luminance.

## FDG

<u>IDG Value</u>	<u>Corresponding FDG Value</u>
≥0.94	1
≥0.90 <0.94	0.94
≥0.80 <0.90	=
<0.80	0.80

(i) Fine at the amount of R\$ 1 million in case IDG < 0.80 is obtained for 3 consecutive quarters or 5 non-consecutive quarters in the period of 5 years;

(ii) The GRANTING AUTHORITY make declare OBSOLESCENCE of the CONCESSION in case IDG < 0.6 is obtained for 6 consecutive quarters or 10 trim on-consecutive quarters.



- ✓ 6-Month grace period: IDG=1 (obligation to measure remains)
- ✓ Month 7, IDG from the quarter started in month 4 falls upon
- ✓ Monthly measurements (when applicable) and Quarterly Reports
- ✓ IDG applied on the further months
- ✓ RT<sub>i</sub> – Quarterly Report related to Quarter i
- ✓ Any divergence does not interrupt the payment process, considering that adjustments pursuant to the process of conflict solution are implemented in the monthly compensation after the decision



## Contracting

## Responsibility of the City hall of Porto Alegre

The contracting shall follow the rules in Law 8.666/93 and shall be re-bidden periodically along the validity of the PPP.

## Scope of operation (example)

- i. To assess the performance and calculate the monthly remuneration due to the concessionaire from the effective monthly compensation periodically;
- ii. To evaluate the economic-financial balance of the contract and review the marginal cash flow;
- iii. To evaluate the calculation of the adjustment of amounts provided in the contract;
- iv. To check the costs/expenses and main and extraordinary revenues;
- v. To monitor the performance indexes of the concession execution and validate the obtained data;
- vi. To validate all technical and economic-financial data of the requests for ordinary and extraordinary review;
- vii. To analyze the scenario that has given rise to the claim against the contract terms applicable thereto, generating a technical opinion at the end. The technical opinion shall support the economic-financial analysis, in which the contract manager and the independent verifier shall evaluate and dimension, if any, the economic-financial impact of the claim on the project;
- viii. To recommend the parameters for economic-financial re-composition of the contract or for adjustment of the compensation amount, consolidating the results from his/her analysis in a technical-financial report.

RISKS AND RESPONSIBILITIES		PUBLIC	PRIVATE
1	Elaboration of the municipal registration of the grid		✓
2	Plans, projects and technology used to comply with the parameters in the technical standards and the contract, including suppression of dark points and repressed demand		✓
3	Modernization and expansion of the grid to meet the technical and the contract parameters		✓
4	Investments, costs or additional expenses pursuant to increase of the operational costs and the cost for purchase or maintenance of equipment		✓
5	Highlighted illumination provided in the contract		✓
6	Adjustment of Public Lighting due to street classification along the PPP (vertical growth)		✓
7	Expansion of the grid pursuant to the horizontal growth of the city: expansion of streets, creation of new streets and Operation and maintenance of PL points received from third parties <b>up to the limit of the Credit Bank</b>		✓
8	Extraordinary demands, such as request of additional points or increase of the luminous flow in places, which already meet the standards and the criteria defined in the contract for specific reasons (for example, complementary lighting around a cultural point of interest) <b>up to the limit of the Credit Bank</b>		✓
9	Demand of the Granting Authority of items 7 and 8 above beyond the limit of the Credit Bank	✓	
10	Delay or omission of the Granting Authority in the measures it is responsible for	✓	
11	Technological upgrade to update the contract parameters		✓

RISKS AND RESPONSIBILITIES		PUBLIC	PRIVATE
11	Extraordinary technology innovation requested by the Granting Authority	✓	
12	Operational relationship with CEEE-D		✓
13	Operational relationship with CEEE-D, when the Granting Authority does not assure its delegation to the private	✓	
15	Consumption reduction targets in the electricity bills		✓
16	Failures to provide the service pursuant to interruption of the power supply	✓	
17	Damages to the equipment pursuant to failures in the power supply		✓
18	Share: Accessory Revenues (up to 15% of the gross revenues) and Asset Alienation (50% - 50% economic gain)	✓	✓