Office of Utilities Regulation

Consultation Document

Proposed Criteria
Jamaica Public Service Company Limited
2024 - 2029 Rate Review Process

Publication Date 2023 July 03

OFFICE OF UTILITIES REGULATION

3rd Floor
PCJ Resource Centre
36 Trafalgar Road
Kingston 10

Jamaica

ABSTRACT

The Jamaica Public Service Company Limited (JPS) Electricity Licence 2016 (the "Licence") issued on 2016 January 27 introduced a number of changes in the regulatory framework governing the electricity sector. The two most notable changes are (1) the introduction of a revenue cap approach which replaces the price cap mechanism; and (2) the substitution of a forward-looking approach for the historic test-year approach, which is applied in calculating the tariff.

The forward-looking approach requires that JPS's rates be based on, among other things, forecasted expenditure, revenue, and demand. While such an approach allows for better matching of JPS's activities with its revenues, it may be problematic if there are wide variances in the projections. Consequently, the Licence stipulates that rate setting ought to be based on JPS's Business Plan, which should be guided by an Integrated Resource Plan produced by the Ministry responsible for energy and a Final Criteria developed by the Office of Utilities Regulation ("OUR/Office").

In arriving at the Final Criteria, the Licence requires the Office to publish its Proposed Criteria and consult with stakeholders. This is the second such consultation process since the Licence was issued. The purpose of this Consultation Document is to present an outline of the principles, methodologies, and procedures that the OUR proposes to use in the rate-setting exercise and to elicit comments and inputs from all stakeholders. The responses and comments received in the consultation process will be taken into consideration in the development and promulgation of the Final Criteria, which will inform the 2024-2029 Rate Review exercise.

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CONSULTATION PROCESS

Persons who wish to provide feedback on this Consultation Document are invited to submit their comments in writing to the Offices of Utilities Regulation ("OUR") by post, facsimile or email addressed to: -

Office of Utilities Regulation
P.O. Box 593
36 Trafalgar Road
Kingston 10

Attention: Proposed Criteria – JPS 2024 – 2029 Rate Review Process

Fax: (876) 929-3635
E-mail: thestto@our.org.jm

Responses are requested by 2023 August 18

Responses which are not confidential pursuant to any relevant legislation, will be posted to the OUR's website (www.our.org.jm). Respondents are encouraged to supply their responses in electronic form to facilitate such postings.

Any information respondents deem confidential should be submitted separately and clearly identified as such. In the interest of promoting transparent debate, respondents are requested to limit as far as possible the use of confidentiality markings.

Comments on Responses

There will be a specific period for respondents to view other responses (non-confidential) and to make comments on them. The comments may take the form of correcting a factual error or putting forward counterarguments. As in the case of the responses, comments which are not confidential will be posted to the OUR's website.

Comments on responses are requested by 2023 August 31

Arrangements for viewing responses

This Consultation Document and the responses and comments received by the OUR will also be made available to the public through the OUR's Information Centre ("OURIC"). Persons who wish to view this Consultation Document, responses and comments should make an appointment by contacting:

Mr. Lyndon Adlam
Manager – Records and Information Management

Telephone: (876) 968-6053
Fax: (876) 929-3635
Email: lyndon.adlam@our.org.jm

Individuals with appointments should visit the OUR's offices at:

3rd Floor, PCJ Resource Centre,
36 Trafalgar Road,
Kingston 10

Photocopies of selected responses and comments may be provided on request at a price which reflects the cost to the OUR.

Consultation Timetable

The timetable for the consultation is summarized in the table below:

Event	**Date**
Publication of Consultation Document	2023 July 03
Deadline for Responses to Consultation Document	2023 August 18
Deadline for Comments on Responses to Consultation Document	2023 August 31
Publication of Final Criteria	2023 September 29

ACRONYMS, ABBREVIATIONS AND DEFINITIONS

AFUDC	-	Allowance for Funds Used During Construction
AMI	-	Advanced Metering Infrastructure
ART	-	Annual Revenue Target
Base Year	-	The latest twelve months of operation of the Licensed Business for which there are audited accounts adjusted to reflect: 1) Normal operation conditions, if necessary. 2) Such changes in revenues and costs as are known and measurable with reasonable accuracy at the time of filing and are demonstrated as part of the Business Plan. The Base Year shall represent the first year of the Business Plan
Business Plan	-	JPS's five (5) year plan incorporates, among other things, the Final Criteria set by the Office and the Integrated Resource Plan (IRP) which forms the basis for the Rate Review Process to establish the non-fuel rates.
CAIDI	-	Customer Average Interruption Duration Index
CAPM	-	Capital Asset Pricing Model
CCGT	-	Combined Cycle Gas Turbine
CHP	-	Combined Heat and Power
C&I	-	Commercial and Industrial
CIS	-	Customer Information System
COD	-	Commercial Operations Date
COS	-	Cost of Service
COUE	-	Cost of Unserved Energy
CPI	-	Consumer Price Index
CPLTD	-	Current Portion of Long-term Debt
CRP	-	Community Renewal Program
CRR	-	Community Renewal Rate

Criteria/Final Criteria	-	The set of targets, conditions, methodologies, and principles, which are published by the Office that will govern the Rate Review Process.
CT	-	Current Transformer
CWIP	-	Construction Work-In-Progress
DEA	-	Data Envelop Analysis
DG	-	Distributed Generation
dI	-	The annual growth rate in an inflation and devaluation measure
dPCI	-	The rate of change of the Revenue Target
EA	-	Electricity Act, 2015
EE	-	Energy Efficiency
EEIF	-	Electricity Efficiency Improvement Fund
EGS	-	Electricity Guaranteed Standards
EOS	-	Electricity Overall Standards
ELS	-	Energy Loss Spectrum
FAC	-	Fuel Adjustment Clause
FCAM	-	Fuel Cost Adjustment Mechanism
FOR	-	Forced Outage Rate
FRA	-	Fuel Rate Adjustment
GCT	-	General Consumption Tax
GDP	-	Gross Domestic Product
GOJ	-	Government of Jamaica
GIS	-	Geographic Information System
GS	-	Guaranteed Standards
H-Factor	-	This reflects the heat rate as defined by the Office of the power generated in Jamaica versus a pre-established yearly target in the Five (5) Year Rate Review determination by the Office.
IPP	-	Independent Power Producer

IRP	-	Integrated Resource Plan
JEP	-	Jamaica Energy Partners Limited
JPS	-	Jamaica Public Service Company Limited
KVA	-	Kilo Volt Amperes
KWh	-	Kilowatt-hours
LED	-	Light Emitting Diode
Licence	-	The Electricity Licence, 2016
Licensed Business	-	The business of Generation, Transmission Distribution, Supply and Dispatch of electricity as carried out by JPS under the Licence.
LRMC	-	Long Run Marginal Cost
MAIFI	-	Momentary Average Interruption Frequency Index
MED	-	Major Event Day
MSET	-	Ministry of Science Energy and Technology
MHI	-	Manitoba Hydro International
MV	-	Medium Voltage
MVA	-	Mega Volt Amperes
MW	-	Megawatt
MWh	-	Megawatt-hours
NBV	-	Net Book Value
NG	-	Natural Gas
NTLs	-	Non-Technical Losses
Office/OUR	-	Office of Utilities Regulation
O&M	-	Operation and Maintenance
OMS	-	Outage Management System
OPEX	-	Operating Expenses (prudently incurred)
OUR Act	-	The Office of Utilities Regulation Act
PBRM	-	Performance Based Rate-Making Mechanism

PPA	-	Power Purchase Agreement
PPE	-	Property Plant and Equipment
Project Model	-	A file in Excel format, which specifies, inter alia, all costs and costing assumptions used in determining the projects that are being proposed in the Business Plan.
Q-Factor	-	This is the annual allowed price adjustment to reflect changes in the quality of service provided by the Licensee to its customers. The Office shall measure the quality of service versus the annual target set in the Five-Year Rate Review determination.
QoS	-	Quality of Service
RE	-	Renewable Energy
RF	-	Responsibility Factor
Rate Review Process	-	The five (5) year rate setting process of the Office, as provided for in the Licence, to determine the non-fuel rates to be charged by the Licensee as well as the targets related to the Licensee's performance.
Rate Review period	-	The five (5) year period being considered in the Rate Review Process.
Regulatory Accounts	-	The reports on the financial and operational performance of the Licensee in such detail and format as required by the Office.
Revenue Cap	-	The revenue requirement approved in the last Rate Review Process as adjusted for the rate of change in non-fuel electricity revenues (dPCI) at each Annual Adjustment date as set out in Exhibit 1 of Schedule 3 of the Licence.
ROE	-	Return on Equity
ROI	-	Return on Investment
ROR	-	Rate of Return
SAIDI	-	System Average Interruption Duration Index
SAIFI	-	System Average Interruption Frequency Index
SBF	-	System Benefit Fund
SCADA	-	Supervisory Control and Data Acquisition

SSP	-	Smart Streetlight Programme
TLs	-	Technical Losses
T&D	-	Transmission and Distribution
TOU	-	Time of Use
WACC	-	Weighted Average Cost of Capital
Y-Factor	-	This reflects the achieved results versus the long-term overall system losses.
Z-Factor	-	This reflects adjustment to the non-fuel rate due to special circumstances. The Z-factor is the allowed percentage increase in the Revenue Cap due to any of the special circumstances delineated in the Licence.

1. INTRODUCTION

1.1 On 2016 January 27, the Jamaica Public Service Company Limited ("JPS") was issued a new licence, the Electricity Licence, 2016 ("Licence"), which fundamentally changed the regulatory framework and the methodology for JPS's Rate Reviews and the calculation of its tariff. The two most notable changes in the Licence arise from (1) the introduction of a revenue cap approach which replaces the price cap mechanism; and (2) the substitution of a forward-looking approach to the calculation of the tariff for the historic test-year approach.

1.2 While this relatively new rate review methodology has the advantage of being more proactive in its orientation, it relies, to a significant degree, on the capacity of the utility and the regulator to forecast with a fair degree of accuracy, customer preferences; technological developments; changes in input prices; the nature of competition within the industry, as well as the trajectory of key macroeconomic variables and other factors.

1.3 Against this background, the Rate Review Process is a rigorous and time consuming one, which, in order to be effective, must begin at least two (2) years prior to the actual submission of the Rate Review application by JPS. A key part of the Rate Review process is the publication of the Proposed Criteria and Final Criteria fifteen (15) months and nine (9) months respectively, before the submission of JPS's Rate Review application.

1.4 The Rate Review Process is conducted at five (5) year intervals and the next such review is scheduled for 2024 April. The Final Criteria is designed to provide guidance to JPS with respect to the elements of the tariff mechanism that are integral to the Rate Review Process. In this respect, it provides a channel for stakeholders in the industry to discuss critical issues related to the tariff, thereby minimizing the risk for significant disputes after the rates are determined by the Office of Utilities Regulation ("Office"/ "OUR").

1.5 In arriving at the Final Criteria, the Licence requires that the Office publishes the Proposed Criteria and consults with stakeholders. Considering this requirement, the OUR publishes this Consultation Document on the proposed criteria for the JPS 2024-2029 Rate Review Process with a view to elicit comments and feedback from stakeholders. All responses and comments will be taken into consideration in the development and promulgation of the Final Criteria.

2. LEGAL AND REGULATORY FRAMEWORK

2.1 The OUR is a multi-sector regulator established pursuant to the Office of Utilities Regulation Act ("OUR Act") to regulate the provision of prescribed utility services in Jamaica. Prescribed utility services are defined in section 2 and the First Schedule of the OUR Act to include the generation, transmission, distribution and supply of electricity.

2.2 Section 4(d) of the Electricity Act, 2015 also provides that "*the Office shall regulate the electricity sector generally.*"

2.3 In the exercise of its powers and functions, the OUR is mandated under section 4(3) of the OUR Act to:

"...undertake such measures as it considers necessary or desirable to-

a) "…
b) protect the interests of consumers in relation to the supply of a prescribed utility service;
c) …
d) promote and encourage the development of modern and efficient utility services…"

2.4 Among the various powers and functions of the OUR set out in section 4 of the OUR Act, is the power to determine rates in respect of the generation, transmission, distribution, and supply of electricity. Sections 4(4) and 4(4A) of the OUR Act state, in part:

"(4) Subject to subsection (4A), the Office shall have power to determine, in accordance with the provisions of this Act, the rates or fares which may be charged in respect of the provisions of a prescribed utility service.

(4A) The rates determined by the Office in respect of prescribed utility services for the generation, transmission, distribution and supply of electricity shall -

(a) be in accordance with -

(i) the provisions of this Act and any regulations made under this Act;

(ii) the Electricity Act and any regulations made under that Act;

(iii) all policy directions issued by Cabinet with respect thereto; and

(iv) the tariff provisions set out in all licences and enabling instruments with respect thereto..."

2.5 With respect to the determination of rates in the electricity sector, section 4(4A) of the OUR Act additionally requires that the OUR seeks the opinion of the Bank of Jamaica in

determining the appropriate rate of return on investment. The OUR is also required to take into account the following matters:

(a) the interest of consumers in respect of matters, including the cost, safety and quality of the services;

(b) Jamaica's economic development;

(c) the best use of indigenous resources;

(d) the possibility of including specific tariffs to encourage the regularization of and payment for, electricity usage by consumers who are unable to pay for the full cost of the services provided; and

(e) the possibility of including specific tariffs for special economic zones, and wholesale rates for large consumers, to enhance their competitiveness and Jamaica's economic development.

2.6 Condition 15 and Schedule 3 of the Licence make provision for the determination of JPS's rates. Condition 15 provides, in part:

"*Condition 15: Price Controls*

1. The Licensee is subject to the conditions in Schedule 3.

2. The rates to be charged by the Licensee in respect of the Supply of electricity shall be subject to such limitation as may be imposed from time to time by the Office."

2.7 Schedule 3 of the Licence, which is predicated on the revenue cap principle, sets out the principles and process of establishing rates for JPS. The revenue cap principle outlined in Schedule 3 of the Licence is as follows:

"The basis of rate setting shall be the revenue cap principle which looks forward at five (5) year intervals and involves the de-coupling of kilowatt hour sales and the approved revenue requirement..."

2.8 Schedule 3, paragraphs 6 to 9 of the Licence outline the filing of JPS's Rate Review application. Paragraph 6 reads as follows:

"The Licensee shall file with the Office proposed non-fuel rate schedules and shall demonstrate that the non-fuel rates proposed for the various rate categories will generate the non-fuel revenue requirement on average over the five-year rate review process."

2.9 Thereafter, the Office, within ten (10) working days of the submission of the Rate Review application, shall indicate its acceptance or rejection of the application. The Rate Review exercise begins upon the OUR's acceptance of the rate filing and pursuant to Schedule 3,

paragraph 25, the OUR is mandated to make a determination within one hundred and twenty (120) days after acceptance of the application.

2.10 Paragraphs 10 to 15 of Schedule 3 set out the contents of the rate review application. Pursuant to Schedule 3, paragraph 10, the most recent Integrated Resource Plan (IRP) issued by the responsible ministry, the OUR's published Final Criteria, and the Business Plan developed by JPS are critical supporting documentation in the five-year rate setting process. Paragraph 10 reads as follows:

"The Business Plan, the most recent Integrated Resource Plan ("IRP"), the published final criteria, the Base Year and the cost-of-service study shall comprise the justification for the rate proposal of the Licensee."

2.11 Schedule 3, paragraphs 11 and 12 stipulate as follows:

"11. The criteria published by the Office shall include but not be limited to the following:

- *Anticipated change to the demand for electricity;*
- *The productivity improvement;*
- *Allowed return on equity ("**ROE**"); and*
- *All annual targets.*

"12. The published final criteria, the most recent IRP and the Base Year shall form the basis of the Business Plan."

2.12 Schedule 3, paragraphs 19 and 20 set out the timeline within which the Proposed Criteria is to be developed and consulted on and, when the Final Criteria should be published. The said paragraphs read as follows:

"19. Fifteen (15) months before the commencement of the Rate Review, the Office shall publish the proposed criteria for the next Rate Review process.

20. No later than twelve (12) months before the rate review, the Office shall initiate a consultative process by which the criteria should be arrived at. The Licensee and other stakeholders shall be afforded sixty (60) days to respond and comment on the criteria. Taking these responses and comments into consideration, the Office shall publish the final criteria no later than nine (9) months before the rate review."

3. RATE REVIEW PROCESS

3.1 Publication and Consultation

3.1.1 The Licence stipulates that the Rate Review Process is to be conducted at five (5) year intervals and shall be done in accordance with the revenue cap principle. Pursuant to the provisions of the Licence, the next Rate Review Process is scheduled to begin 2024 April. The Licence also outlines the "Pre-Rate Review Process activities", which is designed to facilitate transparency and efficiency in the Rate Review exercise. Based on the provisions of the Licence, the activities and timelines are summarized in Table 1 below:

Table 1 – Pre-Rate Review Activities and Timelines as Prescribed by the Licence

	ACTIVITY	DATE	BEFORE REVIEW (Months)	RESPONSIBLE AGENCY
A	Publication of IRP	2023 Jan	15	MSET
B	Publication of Proposed Criteria	2023 Jan	15	OUR
C	Consultation on Proposed Criteria			
C1	Commencement of Consultation	2023 Apr	12	OUR
C2	Feedback	2023 Apr - Jun	12 - 10	JPS/Stakeholders
C3	Publication of Final Criteria	2023 Jul	9	OUR
D	Submission of Rate Review Application	2024 Apr	-	JPS

3.1.2 The stipulated date for the initial publication of the Proposed Criteria, that is 2023 January, was not achieved due to delays related to the multiplicity of issues that emerged in the sector and the OUR's own resource constraints. Having regard to the fact that the initial publication of the Proposed Criteria was meant to facilitate consultation with stakeholders and, in light of the delay in the publication of the IRP, which correctly should be issued simultaneously with the Proposed Criteria, the OUR considers it prudent to proceed directly to the consultation process.

3.2 Revenue Requirement

3.2.1 The Licence defines Revenue Requirement as the non-fuel cost that the Licensee should recover through the non-fuel rates. This is so because the fuel cost net of efficiency adjustments is passed on directly to customers through the tariffs.

3.2.2 The Revenue Requirement under the revenue cap principle comprises two (2) main elements:[1]

a. The Return on investment (ROI) for the Licensed Business;[2] and

b. Recovery of all prudently incurred expenses of the Licensed Business including:

i. Non-fuel operating costs/expenses
ii. Depreciation
iii. Taxes

3.2.3 The Revenue Requirement may be expressed as follows:

$$RR = ROI + OPEX + D + T$$

Where:

RR	= Revenue Requirement
ROI	= Return on investment; and
OPEX	= Non-fuel operating costs/expenses (prudently incurred)
D	= Depreciation
T	= Taxes

3.2.4 In delineating the Criteria, the four components of the Revenue Requirement will be examined, starting with the Rate of Return followed by the approved operating expenses.

3.3 Return on Investment

3.3.1 The ROI is the product of the utility's Rate Base (RB) and its Weighted Average Cost of Capital (WACC). Mathematically, this may be expressed as:

$$RR = ROI + OPEX$$

Where:

RB	= Rate Base
WACC	= Weighted Average Cost of Capital

[1] Schedule 3, paragraph 27 of the Licence

[2] The ROI is the net investment (Rate Base) in the Licensed Business multiplied by the WACC to calculate the capital recovery. The calculation of the Rate base is set out in Schedule 3, paragraph 29 of the Licence.

3.3.2 WACC combines the approved rate of return (ROR) of all categories of funds in the business in proportion to each fund's contribution to the actual or deemed capital structure to yield a single ROR for the company. WACC (pre-tax) may be expressed as[3]:

$$WACC_{(pre-tax)} = r_D \left(\frac{D}{D+E}\right) + \frac{r_E}{(1-t)} \left(\frac{E}{D+E}\right)$$

Where:

r_D	= Cost of debt
r_E	= Rate of return on equity (or ROE)
D	= Value of debt in the capital structure
E	= Value of equity in the capital structure
t	= Tax rate.

3.4 Cost of Debt

3.4.1 Consistent with the practice in previous Rate Reviews, the proposed cost of debt should be based on the weighted average borrowing cost for JPS' long-term debt. The cost of debt that was approved for the 2019 – 2024 Rate Review period is 7.57%.

3.4.2 All prudently incurred costs associated with the issuance of debt such as commitment fees, arrangement fees, due diligence fees, breakage costs and refinancing fees should be included in the non-fuel operating costs/expenses.

[3] Note, $\left(\frac{D}{D+E}\right)$ represents the 'gearing ratio'.

Criterion 1:

In presenting information on the cost of debt for the 2024 – 2029 Rate Review, JPS shall be required to provide a schedule showing the weighted average interest rate of its long-term debt. The schedule shall be based on the company's audited financial position as at 2023 December 31 and shall include:

a) A list of all its long-term debt and their corresponding amounts

b) The associated interest rate for each loan

c) The computation of the weighted average interest rate

d) Prudently incurred costs associated with the issuance of debt such as commitment fees, arrangement fees, due diligence fees, breakage costs and refinancing fees should be included in the non-fuel operating expenses.

3.5 Rate of Return on Equity

3.5.1 In all previous Rate Reviews conducted by the OUR, the Capital Asset Pricing Model (CAPM) approach has been the methodology used for the determination of JPS's approved rate of Return on Equity (ROE). There is a general acceptance on the part of both JPS and the OUR of the CAPM as the most suitable approach for the computation of JPS's ROE. In arriving at the decision to employ the CAPM model, the OUR, in 2017, engaged the services of a globally recognized economic consulting firm, NERA Economic Consulting (NERA), to provide advice on an appropriate approach to the determination of the ROE for JPS. The study identified three main methodologies that are in use globally. Namely, the CAPM, the Dividend Growth Model and the Market to Asset Ratios. The study revealed that the CAPM was the most appropriate methodology for the Jamaican context.

3.5.2 In the 2017 consultation process, the OUR sought and obtained guidance from the Bank of Jamaica (BOJ) on the ROE in accordance with the requirements of Schedule 3, paragraph 30 (c) of the Licence. The BOJ had no objection to the ROE methodology in the Proposed Criteria. JPS was also consulted during the 2017 consultation process and the OUR shared the results of the study with the company and the Ministry of Science, Energy and Technology (MSET). The methodology was successfully applied in the 2019-2024 Rate Review.

3.5.3 In general, the data required for estimating the ROE under the CAPM is readily available and the methodology in its generic form in international regulation. In this regard, the CAPM

methodology allows JPS and the OUR to draw on international best practice in the calculation of the ROE.

3.5.4 Consistent with the methodology used in the 2019 Determination Notice, the proposed ROE should be based on the CAPM. The ROE (post-tax) that was approved for the 2019 – 2024 Rate Review period is 10.78%.

Criterion 2:

a) In computing the ROE, JPS shall use the CAPM methodology based on the formula below:

$$\textbf{Rate of Return on Equity} = R_f + [\beta * (TMR - R_f)] + CRP$$

Where;

R_f = Risk free rate

β = Beta

TMR = Total Market Return

CRP = Country Risk Premium

b) In addition, the following shall be observed with regards to the data used in the ROE calculation:

i. R_f shall be the U.S. long-run historical average return on bonds (1998-2023);

ii. β shall be based on the latest information on the five (5) year beta for all U.S. electric utilities from Bloomberg database;

iii. The Mature Market Equity Risk Premium shall be computed indirectly by subtracting the risk free rate (R_f) from the Total Market Return (TMR)*;

iv. The TMR is the arithmetic average of long-run historical data of U.S. Market (1900-2023);

v. The CRP shall be derived from the 2023, one (1) year average of the bond yield spread of the ten (10) year Jamaican USD denominated sovereign bond and the US 10-year Treasury bond.

*[NB: See Section 9.3.2 -9.3.4 of the JPS Rate Review 2019-2024: Determination Notice Document (No. : 2020/ELE/016/DET.003) for calculation methodology]

3.6 The Rate Base[4]

3.6.1 The Rate Base is the value of the net investment in the Licensed Business. JPS's Rate Base includes the assets that are in use, will be expected to be in use over the 2024 – 2029 Rate Review period and are deemed useful in providing electricity services to its customers. The Rate Base shall be based on the approved net book value of the company's assets for the period 2019 – 2024 as informed by the Business Plan.

Criterion 3:

a) Consistent with Schedule 3, paragraph 29 of the Licence, the Rate Base shall be computed as follows:

$$Rate\ Base = Property\ Plant\ and\ Equipment + Intangible\ Assets + Working\ Capital + Long\ Term\ Receivables + Other\ Assets - offsets$$

b) The components of the Rate Base identified in the above formula shall be as follows:

i. The Property Plant and Equipment ("PPE") ; along with the net book value of the company's assets this shall also include construction work in progress; offset by impaired assets, customer financed assets (including electricity efficiency improvement fund assets), rural electrification assets, less revaluation balance/capital reserve;

ii. Intangible Assets (i.e., assets that are not physical in nature e.g., copyright, software licences)

iii. The working capital (i.e., accounts receivable + cash & short-term deposits + tax recoverable + inventory – account payable – customer deposits – bank overdraft – short term loans) deployed;

iv. Long Term Receivables;

v. Other Assets; and

vi. Offsets which, refer to:
- Employee benefit obligations; and
- Deferred revenue.

[4] Schedule 3, paragraph 29 of the Licence

Criterion 3 (continued):

c) An item of PPE recognized as an asset in the Rate Base shall be carried at its cost less any accumulated depreciation and any accumulated impairment losses.

d) The Rate Base for the base year and each discrete year in the 2024-2029 review period shall be substantiated with the relevant supporting schedules, and shall be structured to include:
   i. Gross Plant Opening Balance (PPE, Intangible Assets, CWIP, etc.).
   ii. Net Plant Additions.
   iii. Accumulated Depreciation.
   iv. Gross Plant Closing Balance.
   v. Net Fixed Assets Closing Balance.

e) Electricity Efficiency Improvement Fund (EEIF), System Benefit Fund (SBF) and other customer contributed assets shall not be included in the rate base but JPS will be required to list these assets along with their net book value as of 2023 December 31.

f) The value of the Electricity Disaster Fund (EDF) assets as of 2023 December 31, shall be clearly stated and shall not be included in the Rate Base. JPS shall also clearly identify the forecasted value of EDF assets for the 2024 – 2029 Rate Review period.

3.6.2 For the avoidance of doubt, as provided in the Licence:

1. The current portion of long-term debt (CPLTD) shall not be an off set in the Rate Base, since this is part of the long-term funding of the Licensee; and
2. The Revenue Requirement shall not include any Allowance for Funds used during Construction (AFUDC)[5], since provision is made in the Rate Base for Construction Work in Progress (CWIP)[6].
3. Customer contributed assets or assets that are not a normal part of JPS's revenue stream but are financed through the tariffs or other means approved by the OUR shall not be included in the company's rate base. Such assets would include those acquired through the EEIF, the SBF, Bogue Plant Reconfiguration Fund or any similar fund.

[5] AFUDC represents the net cost for the period of construction of borrowed funds used for construction purposes and a reasonable rate on other funds when so used.

[6] CWIP represents the balance of funds, which are invested in the utility plant under construction but not yet placed in service.

4. Capital costs (and related OPEX) associated with JPS's "virtual IPP" managed assets (such as, JPS Munro Wind (3MW), JPS Maggotty Hydro (6.3MW), JPS/CB 10MW CHP DG facility, etc.), shall not be included in the company's proposed "rate base" and Revenue Requirement (as applicable) for the normal utility business.

Reporting of Property Plant and Equipment

3.6.3 At the time of filing its Rate Review application, JPS shall submit its fixed asset register, in a format (preferably Excel format) that separates each asset into its various asset class/sub- categories. That is, the company's PPE shall be broken down into its respective sub-categories namely: land and buildings, production (generation) plant and equipment, transmission and distribution plant and equipment, general plant and machinery, computer equipment, office fixtures and fitting.

3.7 Non-Fuel Operating Costs/Expenses

Non-Fuel Operating Expense:

3.7.1 In keeping with paragraph 31 of Schedule 3 of the Licence, 'non-fuel operating costs' means "[a]*ll prudently incurred costs which are not directly associated with investments in capital plant and other operating costs, which shall include but not be limited to, salaries and other costs related to employees; operating costs of generation, transmission and distribution and supply facilities; power purchase costs and other related costs including but not limited to working capital and credit support charges incurred under approved PPAs, fuel supply agreements and other related infrastructure arrangements; interest and other financial costs on other borrowings and working capital requirements not associated with capital investment; foreign exchange results loss/(gain); rents and leases on property associated with the Licensed Business; taxes which the Licensee is required to pay other than income taxes of the Licensee; and other costs which are determined to be reasonably incurred in connection with the Licensed Business...*"

3.7.2 From a regulatory perspective any item of cost to be included in the company's OPEX for the purposes of establishing the Revenue Requirement, must be necessary and prudently incurred. In addition, under the Revenue Cap regime, it is expected that JPS will achieve operational efficiencies over time. In light of this, JPS shall be required to clearly identify the improvement in efficiencies it expects to attain on its OPEX; and the same shall be reflected in the Business Plan to be filed with the Office.

OPEX attributable to Random Factors

3.7.3 Inevitably, some operating expenses of the Licensed Business will arise from sporadic or unplanned events such as storms, foreign exchange losses/gains and changes in tax policy.

Such events may have significant implications for the profitability of the Licensed Business. Random events that impact the company's costs are provided for through:

a) The Annual Revenue Target Mechanism

b) The Z-Factor component of the Revenue Cap mechanism

c) The Electricity Disaster Fund (EDF)

3.7.4 In this regard, JPS will not include any provision in its OPEX forecasts on account of random events.

Taxes

3.7.5 The Licensed Business is required to pay a variety of taxes, including General Consumption Tax (GCT), import taxes, income taxes and property taxes. These taxes are all included in the allowed operating expenses since they are payable under the law.

Power Purchase Cost

3.7.6 Schedule 3, paragraph 31 of the Licence specifies that power purchase costs are a component of the non-fuel operating costs and are therefore correctly an operating expense. However, it is recognized that operating expenses can be classified into two categories: "production" and "non-production" costs. For reasons of transparency and accuracy in the attribution of cost, it is sometimes necessary to separate these costs by way of a decoupling mechanism. One purpose for employing such a mechanism is to isolate the cost over which the utility actually has control in the short run (i.e., the period between rate cases).[7]

3.7.7 Currently, non-fuel power purchase cost is an embedded component in JPS's non-fuel tariff and fluctuations in the monthly non-fuel power purchase costs are addressed via adjustments to the fuel rate. However, the fact that these costs are embedded in the non-fuel tariff and the annual adjustment to the tariff by growth rate (dI) is not usually in sync with the escalation factors in the various power purchase agreements (PPAs), which may lead to under or over-recovery of power purchase costs.

3.7.8 Given that the non-fuel power purchase cost is recognized as a part of JPS's OPEX, even though it is out of the control of JPS, it should be decoupled from other non-fuel costs and treated as a direct pass through on customers' monthly bill.

Depreciation

3.7.9 The regulatory literature defines depreciation, generally, as the decline in or loss of value in an asset. In respect of the accounting process, depreciation is the systematic allocation of the depreciable value of an asset over its useful life. Where the depreciable value is the

[7] Regulatory Assistance Project (RAP); "Revenue Regulation and Decoupling: A Guide to theory and Application" November 2016. http://www.raponline.org/wp-content/uploads/2016/11/rap-revenue-regulation-decoupling-guide-second-printing-2016-november.pdf

initial acquisition costs of the capital asset less its residual/salvage value (if any), over the estimated useful life of the item.

3.7.10 With respect to the rate setting process, the "price control" provisions of Condition 15 and Schedule 3 of the Licence, outline the requirements/conditions for determining JPS's annual depreciation expense to be included in the 2024-2029 annual Revenue Requirements. Specifically, Condition 5, paragraph 5 of the Licence states that the:

"*Annual depreciation allowance shall be computed by applying reasonable annual straight line depreciation rates to the value of property, plant and equipment stated at book value…"*

3.7.11 Further, Schedule 3, paragraph 32 of the Licence provides for the calculation of the annual depreciation charges as follows:

"…calculated by applying annual depreciation rates, as provided at Schedule 4 (as may be updated from time to time in accordance with this Licence), to the gross value of the individual plant asset accounts included in the approved Rate Base."[8]

3.7.12 In determining the 2024-2029 annual depreciation expenses, the applicable depreciation for each item of PPE recognized as an asset shall be calculated based on its original (initial) acquisition cost.

3.7.13 In cases where capital projects were approved through an Extraordinary Rate Review Determination Notice issued during the 2019-2024 Rate Review period, the effect of which has caused fixed assets funded by the company to become stranded or impaired, for any such events, the company should include in the 2024-2029 Rate Review Application a separate schedule covering the stranded/impaired assets. This schedule should be compiled in MS Excel format, and should include, among other things, the following:

a. Asset name and category.
b. Cost center (name and number).
c. FERC account number.
d. Original asset costs.
e. Asset in-service date.
f. Normal monthly/annual depreciation charges.
g. The accumulated depreciation and NBV up to the date the asset became stranded/impaired.
h. The proposed asset write-off cost.

3.7.14 For capital projects approved by the OUR during the 2019-2024 Rate Review period that have been commissioned into service before the end of the said review period, with the related capital cost transferred to fixed assets, the associated depreciation charges if not incorporated the company's cost/rate structure and recovered up to the end of the 2019-2024 review period, should be presented in the 2024-2029 Rate Review Application, in a

[8] See Schedule 4 of the Licence and JPS 2018 Depreciation Rate Study – Schedule of Rates for Depreciation

separate schedule (MS Excel file), clearly showing, among other things, the asset name/category, original cost, in-service date, and the computed depreciation charges.

3.7.15 Regarding the company's "plant-in-service" up to the end of the base year (2023) and which are projected to continue to be in operation during the 2024-2029 Rate Review period, these assets shall be appropriately represented in the "2023 Fixed Asset Register and 2024-2029 Depreciation Schedule", in which, each component of the plant assets described in JPS 2018 Depreciation Rate Study and Schedule 4 of the Licence shall be depreciated separately. This Fixed Asset Register and Depreciation Schedule shall be developed in MS Excel format and submitted as part of the 2024-2029 Rate Review Application.

3.7.16 For the proposed 2024-2029 capital projects, the related depreciation annual expense shall be assumed to accrue at the end of the year that the project is deemed to be commissioned into service, and the associated CAPEX is transferred to fixed assets. To facilitate the evaluation of the projected annual depreciation expenses, the company shall include in the 2024-2029 Rate Review Application its 2024-2029 CAPEX Depreciation Schedule (MS Excel) associated with the 2024-2029 capital projects, covering, among other things, the project name, project capital cost, in-service date, in-service cost, schedule of CAPEX transfers, and a breakdown of the estimated annual depreciation charge associated with each capital project.

Criterion 4:

JPS in presenting its Non-fuel operating costs/expenses (OPEX) and annual depreciation charges for the 2024-2029 Annual Revenue Requirements shall:

a) Clearly identify the improvement in efficiencies it expects to attain on it OPEX over the Rate Review period and the Business Plan shall clearly delineate JPS' plan to improve efficiency over the rate review period.

b) Exclude from its OPEX any component associated with random events.

c) Provide details of all taxes payable by the company.

d) Provide details on its power purchase costs which shall be decoupled from other operating expense to allow for a direct pass-through to customers.

e) Perform its annual depreciation calculations on the basis of the depreciation rates of the JPS Depreciation Rate Study approved by the OUR.

f) Include the annual depreciation expense for "plant-in-service" at the end of the base year (2023) and the computed depreciation charge for these assets in each year of the 2024-2029 Rate Review period. These depreciation expenses shall be fully and accurately represented in the 2023 Fixed Asset Register and 2024-2029 Depreciation Schedule, which must be included in the 2024-2029 Rate Review Application.

g) Include in the 2024-2029 Rate Review Application its 2024-2029 CAPEX Depreciation Schedule (MS Excel) associated with its proposed 2024-2029 capital projects, covering, among other things, the project name, project capital cost, in-service date, in-service cost, schedule of CAPEX transfers, and a breakdown of the estimated annual depreciation expense associated with each capital project.

h) Clearly show the respective calculations and formulas used to derive the relevant depreciation expenses in spreadsheet (MS Excel) format.

3.8 Revenue Recovery

3.8.1 The Licence mandates that JPS's Revenue Requirement shall be recovered through the rates approved by the OUR.[9] JPS, as in the case of many electric utilities, recovers its revenues over three different billing variables:

1. Energy consumption (kWh)
2. Power demand (kVA)
3. Number of customers

3.8.2 Pursuant to the Licence, JPS's tariff is based on a five (5) year forecast. Therefore, the billing variables are significant, particularly since a revenue requirement must be generated for each year. In this regard, the over or under-projection of the billing variables may result in JPS's profit falling outside of an acceptable band which could put excessive pressure on the review process by way of Z-Factor adjustments or Extraordinary Rate Reviews within the Rate Review period.

3.8.3 In addition, the rapid development in renewable technologies and changes in consumer energy preferences could make the conventional forecasting tools used in the Jamaican context less reliable.

3.8.4 In light of this, the OUR will develop a five-year forecast for the Rate Review period and a consultative approach will be adopted in determining the final forecast. Notwithstanding, JPS shall be required to submit its own five (5) year demand forecast as part of their tariff submission which the OUR will assess in the determination of the final five-year forecast applicable to the Rate Review.

3.8.5 The approach, all else being equal, will be consistent with the methodology used in the 2019-2024 Rate Review and will incorporate the following three (3) steps:

1. The derivation of the demand forecast for the respective rate classes expressed in kWh consumption.
2. The computation of gross system losses by adding net system losses to station use. Each component of gross system losses shall be allocated to the rate classes to derive gross electricity kWh consumption.
3. The derivation of projected system peak demand, using the following methodology:
    a. The estimation of the system load factor from recent historical trends.
    b. The computation of the peak demand for each year, by dividing the projected gross generation by the number of hours in the year multiplied by the system load factor.

[9] Schedule 3, paragraph 28

c. The estimation of the contribution of each rate class to the system peak, using JPS's latest load research information (coincident and non-coincident peak data).

Criterion 5:

In presenting its billing data projections for the five (5) year Rate Review period, JPS shall:

a) Present its demand forecast model along with a clear and logical explanation of the methodology and assumptions used in the construct.

b) Develop five (5) year forecast projections, which shall be submitted in its Rate Review application.

c) Disaggregate its gross losses projection before allocation to each rate class into:

   i. Station Use

   ii. Technical Low Voltage Losses

   iii. Technical Medium Voltage Losses

   iv. Unbilled (Non-technical) Losses

d) Provide annual projections for sales (kWh), demand (KVA), and number of customers by rate categories; and

e) Clearly indicate all assumptions (including load factor) made, along with the rationale for their use in its billing data projections.

3.9 Revenue Cap 2024 – 2029 and Tariff 2024/2025

3.9.1 Schedule 3, paragraph 6 of the Licence requires that JPS demonstrates that its proposed non-fuel rates for the various rate categories will generate the non-fuel Revenue Requirement on average over the Rate Review process. It is on this basis that the OUR will establish the Revenue Requirement and an annual revenue cap (RC_y) for each of the five (5) years of the Rate Review period and the tariffs for 2024/2025.

3.9.2 It is worth noting that the non-fuel revenue cap stipulated in Exhibit 1 of Schedule 3 of the Licences represents the summation of JPS's non-fuel costs and the IPPs non-fuel cost. This was the understanding of the architects of the Licence in 2016, since at the time there was no separation of JPS and IPP non-fuel charges in published tariff. Both non-fuel charges

were captured in the customers energy and demand charges of JPS's tariff. In this regard, the Revenue Cap for Year "y" (RC_y) may be expressed as:

$$RC_y = RCJ_y + RCIP_y$$

Where:

RCJ_y = the non-fuel revenue cap for JPS in Year "y"

$RCIP_y$ = the non-fuel revenue cap for IPPs in Year "y"

3.9.3 However, for reasons of transparency at the 2019-2024 Rate Review it was decided that the IPP non-fuel charges should be treated separately from JPS's non-fuel charge. Consequently, for calculation purposes it is practical that the inflation/foreign exchange element of the Annual Revenue Target mechanism (dPCI) be applied exclusively to JPS's component of the Revenue Cap (RCJ_y). The rationale being IPP costs are adjusted for inflation and foreign exchange movements by mechanisms in the IPP contracts and are pass-through directly to customers.

3.9.4 In light of this, the approved non-fuel Revenue Requirement for JPS in each year of the Rate Review period shall be determined by the OUR following an analysis of the Business Plan and financial model.

3.9.5 The OUR, in establishing JPS's revenue caps over the Rate Review period, is mindful of a key regulatory objective of maintaining price stability. In this regard, while the Revenue Requirement for each year of the 2024 -2029 Rate Review period will be established on the basis of the Business Plan, the revenue cap for each year is designed to ensure that:

1) JPS's Non-fuel rates for the various rate categories will generate the JPS non-fuel Revenue Requirement on average over the Rate Review period; and
2) The tariffs are relatively stable from year to year.

3.9.6 In light of this, the following outlines how the annual caps (RCJ) are to be derived:

The average tariff over the Rate Review period, denoted as *T*, is decomposed into three components:

1. Average kWh Tariff – T_{kWh}
2. Average kVA Tariff – T_{kVA}
3. Average Customer Charges – T_c

The computation of each of the components is given as follows:

$$T_{kWh} = \frac{\sum_y \frac{RR_y^{kWh}}{(1+wacc)^y}}{\sum_y \frac{kWh_y}{(1+wacc)^y}}$$

$$T_{KVA} = \frac{\sum_y \frac{RR_y^{KVA}}{(1+wacc)^y}}{\sum_y \frac{KVA_y}{(1+wacc)^y}}$$

$$T_C = \frac{\sum_y \frac{RR_y^{C}}{(1+wacc)^y}}{\sum_y \frac{C_y}{(1+wacc)^y}}$$

Where,

RR^{kWh}_y = the revenue requirement to be recovered through kWh charges for year "y"; RR^{kVA}_y = the revenue requirement to be recovered through kVA charges for year y; RR^{C}_y = the revenue requirement to be recovered through customer charges for year y.

And,

kWh_y, kVA_y and C_y are the forecast of energy consumption, kVA demand and customer count respectively for each year "y" in the Rate Review period.

3.9.7 The revenue cap RCJ_y for each year "y" in the Rate Review period will then be computed as:

$$RCJ_y = T_{kWh} \cdot kWh_y + T_{kVA} \cdot kVA_y + T_C \cdot C_y$$

3.9.8 In order to protect customers from delays in the implementation of JPS's capital expenditure programme, Schedule 3, paragraph 46(d) (iii) of the Licence stipulates:

"where the Licensee's capital & special program expenditure are delayed and such delay results in a variation of 5% or more of the annual expenditure, the Z-factor adjustment will take into consideration the over-recovery of such expenditures plus a surcharge at the WACC;"

3.9.9 In addition, Schedule 3, paragraph 48 states that the failure by the Licensee to undertake activities in its capital programme should be treated as follows:

"If the Licensee does not undertake the investment activities stated in the Business Plan on an annual basis, subject to a variation of 5% of the annual expenditure, the Office shall adjust the next year's rates commensurate with the present value amount that was given to the Licensee in the rate but was not utilized for the investment activities…"

3.9.10 On the other hand, to protect JPS from unplanned increase in its capital expenditure programme, Schedule 3, paragraph 46(d)(v) states that the Z-factor adjustment is necessary,

"where the Licensee demonstrates and the Office agrees that an extra-ordinary level of capital expenditure or a special programme is required (i.e. greater than 10% for any given year relative to the previously agreed five-year Business Plan)"

3.9.11 For the avoidance of doubt, in all instances where there are variations in the capital expenditure programme, the adjustments to the tariff shall be consistent with classification of projects (i.e., Major Project, Extraordinary Maintenance Project and Minor Project) delineated in Section 4.5.

3.9.12 Pursuant to section 14 of the OUR Act, JPS may enter into special contracts for the supply of electricity. In such instances, the recoverable revenues (actual or projected) from customers with special contracts shall be an offset to the total Revenue Requirement.

3.9.13 Condition 12 of the Licence mandates JPS to implement an Electric Power Wheeling service for customers with an annual average demand in excess 1 MVA in accordance with such terms and conditions as are approved by the Office. Given the nature of Electric Power Wheeling services which involves imbalances between supply and demand, JPS will be required to provide "Top-up", "Standby" and "ancillary" services to power wheeling customers.

3.9.14 Recoverable revenues from the use of the system by way of "Top-up" or "Standby" services or any other ancillary services shall initially be treated as outside of the total Revenue Requirement. These categories of services shall be included in the Revenue Requirement and tariff basket when sufficient billing and cost data becomes available.

3.9.15 Revenues projected by JPS to be earned through the sale of electricity based on special contracts between JPS and its customer shall be deducted from the total Revenue Requirement.

Criterion 6:

a) The revenue cap (RC_y) for JPS in each year "y" of the Rate Review period shall be set during the 2024 – 2029 Rate Review and will be determined as follow:

$$RCJ_y = T_{kWh} \cdot kWh_y + T_{kVA} \cdot kVA_y + T_C \cdot C_y$$

b) The average kWh tariff (T_{kWh}), kVA tariff (T_{kVA}) and average customer charges (T_C) is determined by:

$$T_{kWh} = \frac{\sum_y \frac{RR_y^{kWh}}{(1+wacc)^y}}{\sum_y \frac{kWh_y}{(1+wacc)^y}}$$

$$T_{KVA} = \frac{\sum_y \frac{RR_y^{KVA}}{(1+wacc)^y}}{\sum_y \frac{KVA_y}{(1+wacc)^y}}$$

$$T_C = \frac{\sum_y \frac{RR_y^{C}}{(1+wacc)^y}}{\sum_y \frac{C_y}{(1+wacc)^y}}$$

c) JPS shall clearly indicate all assumptions (including load factor) made along with rationale for their use in its billing data projections.

d) Revenues that are generated from customers through the sales of electricity services by way of special contracts, "Top-up", "Standby", Electric Power Wheeling or any other ancillary services shall be treated as an offset to the total Revenue Requirement initially until adequate data is available.

e) The JPS's revenue cap (RCJ_y) shall not include revenues from the purchase of power, which shall be a direct pass through to customers.

3.10 Rate Design

3.10.1 Pursuant to Schedule 3, paragraph 36 of the Licence, the rates proposed by JPS shall follow the following rate design principles:

a. The proposed rates are cost reflective.

b. The proposed rates promote economic efficiency.

c. The proposed rates are non-discriminatory.

d. The proposed rates comply with the applicable rules and regulations; and

e. The proposed rates take into consideration the policy directive of the GOJ with respect to the electricity sector.

3.10.2 It should be recognised that the principles in 3.10.1 above sometimes conflict with each other. In the event of such occurrences, it is the responsibility of the OUR to resolve them in a judicious and effective manner.

3.10.3 For the 2024-2029 Rate Review application, JPS should conduct a cost-of-service study which should also be included in its Rate Review application. As indicated in an OUR letter dated 2023 April 28, JPS is required also to conduct a Long Run Marginal Cost (LRMC) Study. Together these two studies should create the foundation for establishing the tariff for all the rate classes.

3.10.4 At the very minimum, JPS's Rate Review application should include the various customer charges and the non-fuel energy charges. In addition, where applicable demand charges should be included. Energy and demand charges should be shown in both standard and time-of-use (TOU) charges consistent with the classification established. The spreadsheet models showing the derivation the rates and charges ought to be a component of the Rate Review application.

3.10.5 The rate structure that is proposed should identify the existing rates for each of the rate classes along with the proposed rates, it should include but not be limited to all the areas mentioned below:

a) Net billing customers

b) Electric vehicles

c) Wheeling customers

d) Auxiliary interconnection customers

e) Distributed energy resources (DER)

f) Prepaid customers

g) TOU for RT10 and other specified classes

3.10.6 For any new service category proposed by JPS, the company shall provide full justification for its introduction and supporting calculations for the rates associated with the proposed service.

Criterion 7:

a) The cost-of-service study specified in the Licence along with a LRMC study shall form the foundation of JPS's tariff design submitted in its Rate Review application. The design should meet the following regulatory objectives:
   i. Cost reflectiveness
   ii. Economic efficiency
   iii. Non-discrimination
   iv. Revenue adequacy
   v. Stability
   vi. Predictability
   vii. Compliance with Policy objectives

b) JPS's rate design shall include tariffs for net billing customer, electric vehicles, power wheeling and ancillary interconnection, distributed energy resources (DER), prepaid customers and TOU for RT10 and other specified classes.

c) For any new service category proposed by JPS, the company shall provide full justification for its introduction and supporting calculations for the rates associated with the proposed service.

3.11 Productivity Improvement Factor

3.11.1 Even though an explicit X-factor is not included in the Performance Base Rate Mechanism (PBRM) Schedule 3, paragraph 11of the Licence stipulates that the Final Criteria should include a productivity improvement factor (PI-Factor)[10]. In keeping with this provision, the OUR will update the 2019-2024 productivity computations for the upcoming 2024-2029 Rate Review period.

[10] The PI-Factor is referred to as the X-Factor in other jurisdiction.

3.11.2 As established in the 2019-2024 Rate Review, the methodology for the calculation of the PI-Factor shall be as follows:

1. An efficiency target for the utility based on a benchmarking analysis is computed by using Data Envelopment Analysis (DEA). The summary of the input and output factors employed in the DEA model is shown in Table 2 below.

Table 2: DEA Model Input/ Output Specification

Scale:	**Variable Return to Scale**	
Input Factors:	OPEX	Operating costs/expenses these include staff cost, maintenance expenses, cost of supply services
Output Factors:	Sales [kWh]	The total electricity that is delivered to customers
	Customers (#)	Total number of customers
	Network Length (km)	Total length of network (includes overhead lines and underground cables)
	Supply Size Area (km^2)	The area size in which the distribution companies' serves

The results of the DEA analysis provide a measure of JPS's level of efficiency, which along with other considerations, will be used by the Office to determine an efficiency target (E_T). The Office will determine the number of years over which this target should be achieved (Y_{ET}). The Office will utilize these two factors (E_T and Y_{ET}) and any considered cap on productivity improvement in determining the final PI-Factor. The Office reserves the right to consider other benchmarking tools such as partial benchmarking in determining the annual PI-Factor adjustment.

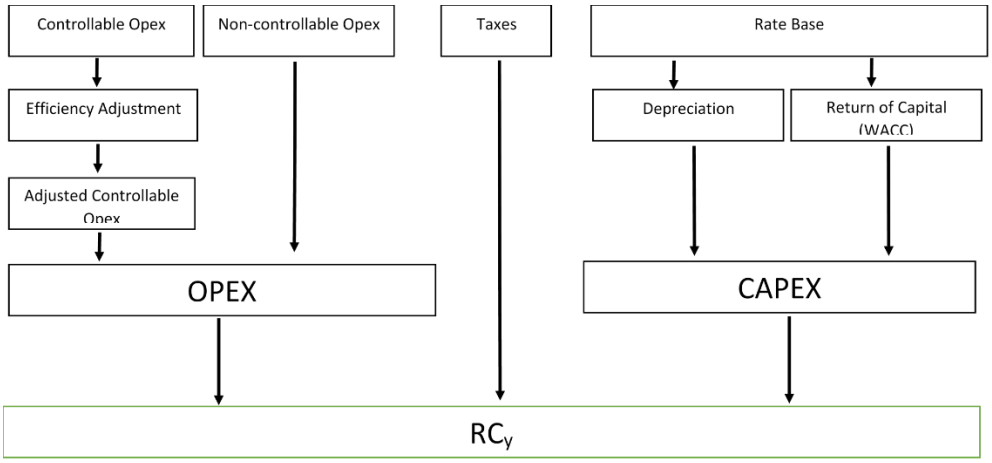
2. JPS's controllable OPEX established by the Office for the base year, will be adjusted by the PI-Factor to determine the adjusted controllable OPEX for each year "y" of the Rate Review period. The controllable OPEX includes items such as payroll costs, maintenance expenses, administrative overheads, and bad debt expenses. Annex 1 shows the model for the computation of the adjusted controllable OPEX which will be used for the 2024-2029 Review Period. Note that the numbers included in Annex 1 are for illustration only and are not to be interpreted as the Office's proposals. Also, in addition to the PI-Factor adjustment, the OPEX is adjusted for a factor which is a weighted average of the projected sales, demand, and customer number growth rates.

3. Finally, the Revenue Requirement (RR_y) for each year, "y" of the Rate Review period shall be computed by adding the adjusted controllable OPEX for that year to the other components of the revenue requirement for that year, as shown below in figure 1. These include:

- Non-controllable OPEX (e.g., interest and financing expenses, sinking fund contribution)
- Capital Expenditure (Depreciation and return on capital)
- Taxes (Grossed Up)
- Revenue offsets and other adjustments (e.g., Carib Cement Revenues)

Figure 01 illustrates the process used to derive RR_y.

Figure 01: Buildup of Revenue Cap[11] (RR_y)



3.11.3 JPS is required to update the OUR's productivity calculation using audited data for the base year. JPS is also required to submit a partial benchmarking analysis which shall include analysis of:

- OPEX per kWh sold
- OPEX per kWh generated
- OPEX per customer

[11] Note that in this particular interpretation of the revenue requirement depreciation is treated as a component of CAPEX rather than OPEX.

3.11.4 In the case of any suggested changes or improvements to the OUR's approach, JPS should clearly state why each change/improvement is necessary and provide theoretical and/or empirical justification to support its arguments.

Criterion 8:

a) The Productivity Improvement Factor (PI-Factor) to be used in the annual adjustment of JPS's Revenue Cap shall be based on a DEA analysis, the results of which may be supported by other productivity improvement study approaches.

b) The DEA analysis shall be based upon the OPEX component of cost. Output factors may include sales (kWh), customer count, network length and size of service area or any other justifiable variables.

c) JPS shall include an updated productivity study based on its latest audited financial statement in the 2024-2029 Rate Review application or the prior year's audited financial data if benchmarking data is not readily available from other jurisdictions. The updated productivity study shall be based on the DEA method.

d) The OUR will assess the results of the JPS's updated productivity study, along with the OUR's own productivity improvement study to determine the PI-Factor applicable for the Rate Review period.

e) JPS's controllable OPEX for 2024 – 2029 shall be adjusted by the PI-Factor and a factor which is the weighted average of the projected sales, demand, and customer number growth rates.

3.12 Quality of Service Standards

3.12.1 Quality of service delivered by the utility is important since it determines the level of satisfaction and customers' experience while consuming a service. An important dimension to the delivery of quality service is the establishment of Guaranteed and Overall Standards. These standards represent minimum service level agreements between the OUR and the utility companies to ensure value to customers.

3.12.2 Currently, JPS is held accountable to fifteen (15) Electricity Guaranteed Standards (EGS) spanning among other things:

- Access to service
- Response to emergency
- Customer complaints/Queries
- Reconnections and disconnections
- Estimated bills
- Meter replacements

3.12.3 These EGS focus on dimensions of service quality which are:

a) Important to consumers;
b) Controllable by the utility; and
c) Measurable by the regulator

3.12.3 A breach of an EGS results in a compensatory payment to the affected customer/account that may trigger either an automatic compensation by the utility provider, or alternatively, the affected customer may be required to submit a claim to be compensated.

3.12.4 While the Overall Standards do not offer a compensatory payment to customers where specified service levels are not met, JPS is required to monitor and report on its performance to the OUR. The Overall Standards covers service delivery areas that include:

- Restoration of service after planned and unplanned outages
- Percentage of line fault repairs after report being made
- Frequency of meter testing
- Responsiveness and effectiveness of call centre representatives

3.12.5 The Rate Review Process provides an opportunity for the evaluation and improvement of the existing Quality of Service Standard Schemes. Consequently, JPS shall be required to assess the company's performance over the 2019 - 2023 Rate Review period and indicate its recommendations with respect to the current schemes.

3.12.6 During the 2024-2029 Rate Review process, the OUR in consultation with JPS, will review the Guaranteed and Overall Standards in accordance with the terms and conditions set out in Condition 17 of the Licence.

Criterion 9:

JPS shall be required in its 2024 - 2029 Rate Review application to:

a) Review its performance on all the EGS over the 2019 – 2023 Rate Review period. This should also include any challenges that were or are being faced in meeting the EGS performance criteria, as well as the proposed measures to mitigate those challenges.

b) Indicate any proposed changes, it deems appropriate to the EGS Scheme and provide the rationale for its proposal. This should include the proposal for the development of a list of exemptions to the Guaranteed Standard.

c) In the evaluation of JPS' proposal with respect to its quality-of-service standards, the Office shall take into account, among other things, relevant benchmarks, international best practices, and customer specific data analyses in the introduction of new standards and the revision of existing targets.

d) Outline its proposed performance targets on the Overall Standards over the 2024 – 2029 Rate Review period. This shall also include any challenges that were or are being faced in meeting the performance criteria for existing standards as well as the proposed measures to mitigate those challenges.

4. ANNUAL TARGETS

4.1 Annual Adjustment Mechanism

4.1.1 A revenue cap is a mechanism that establishes the maximum allowed revenue a regulated entity can earn in a given year, while creating the incentive for it to maximize profit by reducing cost. The main difference between the revenue cap and the price cap is that *"if the actual number of units sold differ from the number of forecast units, this will be corrected in the following year to ensure that only the allowed revenue is collected.*[12]*"* As such, the customers bear the demand or volumetric risk under revenue cap regulation.

4.1.2 Additionally, revenue cap can create the framework within which the utility is allowed to set prices, and this has the potential for promoting more efficient pricing.

4.1.3 Revenue caps are deemed to be appropriate under conditions where:

a) there is a high degree of predictability in forecasting demand, as this decreases the risk of price volatility; and

b) the fixed cost portion of the total cost is high. In that regard, the utility would not have a perverse incentive to manipulate the demand forecast to maximize profit in the short run.

4.1.4 In order to make adjustments to the revenue cap for inflation, exchange rates and variations from volumetric and efficiency targets, it is vital to have annual adjustments to the revenue cap. Under the Licence, the annual adjustment mechanism is captured in the following equation:

$$\mathrm{ART_y} = \mathrm{RC}_y(1 + (\mathrm{dI} + \mathrm{Q} \pm \mathrm{Z})) + \left(\mathrm{RS_{y-1}} + \mathrm{SFX_{y-1}} - \mathrm{SIC_{y-1}}\right) * (1 + \mathrm{WACC})$$

Where:

$\mathrm{ART}_y = Allowed\ Revenue\ Target\ for\ current\ year (i.e., y)$

$\mathrm{RC}_{y-1} = the\ Approved\ Revenue\ Cap\ for\ previous\ year\ (i.e., y-1)$

$\mathrm{dI} = change\ in\ inflation$

$\mathrm{Q} = the\ quality\ of\ service\ improvement\ factor$

[12] Alexander, Ian & Shugart, Cris, "Risk, Volatility and Smoothing: Regulatory Options for Controlling Prices" p.11; retrieved from: http://regulationbodyofknowledge.org/wp-content/ uploads/ 2013/03/ Alexander Risk Volatility_ and.pdf on 2016-02-23

$Z = the\ exogenous\ factor$

$RS_{y-1} = Adjustment\ for\ previous\ year\ Revenue\ under/over - recovery$

$SFX_{y-1} = Adjustment\ for\ previous\ year\ Net\ Foreign\ Exchange\ Losses$

$SIC_{y-1} = Adjustment\ for\ Net\ Interest\ Income\ on\ unpaid\ Customer\ bills$

$WACC = the\ Weighted\ Cost\ of\ Capital$

4.1.5 As pointed out in Section 3.9 above, the separation of JPS non-fuel charges from IPP non-fuel charges makes it necessary to apply the price adjustment factor (dPCI) to JPS's revenue cap target (RCJ_y). IPP non-fuel costs are adjusted on a monthly basis and are passed through immediately to customers and therefore needs not to be included in the annual adjustment equation.

4.1.6 The revenue true-up component of the performance-based rate-making mechanism (PBRM) can be expressed as:

$$Revenue\ True\ Up = (RS_{y-1} + SFX_{y-1} - SIC_{y-1}) * (1 + WACC)$$

Where, $RS_{y-1} = TUVol_{y-1} + TULos_{y-1}$

4.1.7 In any given year, if the actual revenue registered by JPS exceeds the established revenue target, the difference in revenue, which is the 'Revenue True-up' would be negative. Consequently, there would be a reduction of the revenue requirement by the difference at the annual review period. On the other hand, a positive 'Revenue True-up' would lead to an increase in the revenue requirement by the difference.

True-Up Volumetric Adjustment ($TUVol_{y-1}$)

4.1.8 The volumetric adjustment for any year is dependent on the variance between the target billing determinants and actual results for the period under review.

4.1.9 The billing determinants for the Volumetric Adjuster (TUVoly-1) on which the true-up is based are Energy (kWh), Demand (kVA) and Number of Customers. The formula for the computation of the adjustment is as follows:

($TUVol_{y-1}$) = Energy True-up + Demand True-up + Customer True-up

Where:

$$\boldsymbol{Energy\ True\ Up} = \left(\frac{kWh\ Target_{y-1} - kWh\ Sold_{y-1}}{kWh\ Target_{y-1}}\right) * Non\ Fuel\ Rev\ Target\ for\ Energy$$

$$\textbf{Demand True Up} = \left(\frac{kVA\ Target_{y-1} - kVA\ Sold_{y-1}}{kVA\ Target_{y-1}}\right) * Non\ Fuel\ Rev\ Target\ for\ Demand$$

$$\textbf{Customer True Up} = \left(\frac{Cust.Ch.Target_{y-1} - Cust.Billed_{y-1}}{Target_{y-1}}\right) * Non\ Fuel\ Rev\ Target\ for\ Cust.Ch.$$

True-Up Losses Adjustment ($TULos_{y-1}$)

4.1.10 Consistent with the Licence, the 'previous year annual revenue target' (ART_{y-1}) consists of JPS previous year non-revenue target (JNF_{y-1}) and the IPP previous year non-revenue target ($IPNF_{y-1}$). Accordingly, the Annual Revenue Target for the previous year (ART_{y-1}) may therefore be expressed as:

$$ART_{y-1} = (JNF_{y-1} + IPNF_{y-1})$$

4.1.11 Consequently, the System Losses adjustment (TULosy-1) equation may be expressed as:

$$TULos_{y-1} = Y_{y-1} * (JNF_{y-1} + IPNF_{y-1})$$

4.1.12 It is important to note that, given that non-fuel IPP cost is a pass through the IPP previous year non-revenue target ($IPNF_{y-1}$) is equivalent to the previous year's actual IPP non-fuel cost.

4.1.13 In computing the system losses true-up (TULosy-1), the disaggregation of system losses into its three (3) established components is required

The components are as follows:

TL = Technical Losses
JNTL = Portion of Non-technical losses which is completely within JPS's control
GNTL = Portion of Non-technical losses which is not completely within JPS's control

4.1.14 Each component is measured against a target that is established by the OUR, as shown in the following equations:

Ya_{y-1} = Target System Loss "a" Rate%$_{y-1}$ – Actual System Loss "a" Rate%$_{y-1}$
Yb_{y-1} = Target System Loss "b" Rate%$_{y-1}$ – Actual System Loss "b" Rate%$_{y-1}$
Yc_{y-1} = (Target System Loss "c" Rate%$_{y-1}$ – Actual System Loss "c" Rate%$_{y-1}$) * RF

Where:

RF = The responsibility factor determined by the Office, which is a percentage from 0% to 100%.

4.1.15 The variances of the three losses components from the target are used to compute a total variance Y_{y-1} in year "y-1" as shown below:

$$Y_{y-1} = Ya_{y-1} + Yb_{y-1} + Yc_{y-1}$$

4.1.16 $TULos_{y-1}$ for year "y-1" (the year preceding the adjustment year) is computed as:

$TULos_{y-1} = Y_{y-1} * ART_{y-1}$

Where: ART_{y-1} = Annual Revenue Target for year "y-1"

Foreign Exchange and Interest Surcharges ($SFX_{y-1} – SIC_{y-1}$)

4.1.17 Paragraphs 55 and 56, Schedule 3 of the Licence 2016, provide as follows:

" 55. The Licensee shall be entitled to an adjustment to the non-fuel rate, based on the difference between the anticipated foreign exchange result loss/ (gain) in the Revenue Cap for the previous year and the actual foreign exchange result incurred in the prior year related to Working Capital and Debt Service driven by JMD to USD foreign exchange results…

56. Any under or over recovery related to these adjustments will include an interest charge or benefit equal to the WACC of the latest year."

4.1.18 $SFX_{y-1} = Annual\ foreign\ exchange\ result\ loss/(gain)\ surcharge\ for\ year\ "y-1"$

This represents the annual true-up adjustment for variations between the foreign exchange result loss/(gain) included in the Base Year revenue requirement and the foreign exchange result loss/(gain) incurred in a subsequent year during the rate review period.

4.1.19 SICy-1 = Annual net interest expense/(income) surcharge for year "y-1".

This represents the annual true-up adjustment for variations between the net interest expense/(income) included in the Base Year revenue requirement and the net interest expense/(income) incurred in a subsequent year during the rate review period. The net interest income shall be deducted from the revenue requirement while net interest expense shall be added to the revenue requirement.

4.1.20 AlC_{y-1} = Actual net interest expense/(income) in relation to interest charged to customers and late payments in year "y-1".

4.1.21 It is important to note that although a Productivity Improvement factor (or PI-Factor) is not explicitly included in the annual adjustment formula above, provision is made for annual efficiency adjustments in the Licence.

4.2 Inflation Adjustment Factor (dI)

4.2.1 The inflation adjustment factor (dI) is the component in the annual adjustment mechanism that keeps JPS's Revenue Requirement constant in real terms. The growth rate (dI) represents the changes in the value of the Jamaican dollar (JMD) against the United States dollar (USD) and the inflation in the cost of providing electricity products and services.

4.2.2 Specifically, dI is:

Where:

EXb = Base US exchange rate at the start of the Rate Review period.

EXn = Applicable US exchange rate at Adjustment Date.

INFUS = Change in the agreed US inflation index as at 60 days prior to the Adjustment Date and the US inflation index at the start of the Rate Review period.

INFJ = Change in the agreed Jamaican inflation index as at 60 days prior to the Adjustment Date and the Jamaican inflation index at the start of the Rate Review period.

USPb = US portion of the total non-fuel expenses as determined from the Base Year.

USDSb = US debt service portion of the non-fuel expenses as determined from financials in the Base Year of the rate setting period

Criterion 10:

a) In the Annual Review exercises between the Rate Reviews, JPS's Revenue Requirement (before adjustments) shall be preserved in real terms by the Growth Rate (dI) equation:

$$dI=(EX_n-EX_b)/EX_b\{USP_b+INF_{US}(USP_b-USDS_b)\}+INF_{us}(USP_b-USDS_b)+(1-USP_b)INF_J$$

b) In performing the annual revenue adjustment for the system losses, consistent with the Licence, the 'previous year annual revenue target' (ART_{y-1}) consists of JPS previous year non-revenue target (JNF_{y-1}) and the IPP previous year non-revenue target ($IPNF_{y-1}$). Additionally, the IPP previous year non-revenue target is equivalent to the actual in the previous year.

c) JPS shall provide the supporting schedules, documentation, calculations, and relevant data to substantiate its Growth Rate proposals, including its derivation of USP_b and $USDS_b$.

d) JPS shall include in its proposed Base Year revenue requirement the annual true-up adjustment amount for anticipated variations between the foreign exchange result loss/(gain).

e) JPS shall include in its proposed Base Year revenue requirement the annual true-up adjustment amount anticipated for variations between the net interest expense/(income).

4.3 Q-Factor Adjustment

4.3.1 As defined in the Licence, the Q-Factor is the annual allowed price adjustment to reflect changes in the quality of service provided by JPS to its customers and is one of the key inputs used in the calculation of the annual revenues/rates required for the PBRM (defined in Schedule 3 of the Licence).

4.3.2 According to Schedule 3 of the Licence, which defines the price control mechanism for JPS, the Office shall apply a Q-Factor to JPS non-fuel rates at each PBRM review. To determine the Q-Factor adjustment, the Office is required to measure JPS's "quality of service" performance for each year in the 5-year revenue cap period versus the annual targets set in the 5-year rate review determination. According to the Licence, the annual targets for the Q-Factor shall normally be established by the Office at the Rate Review and broken out year by year.

4.3.3 To implement this performance-based rate setting process, the OUR must first establishes the relevant targets for the Q-Factor. In doing so, the OUR pursuant to the provisions of the Licence, is required to establish the criteria for evaluating JPS's Q-Factor proposals and the setting of the relevant annual targets for application during the Rate Review period.

4.3.4 Pursuant to Schedule 3, paragraph 37 of the Licence, the Office is empowered to set Q-Factor targets for JPS, which should:

- Be reasonable and achievable.
- Take into consideration the Base Year and historical performance.
- Take into account the agreed resources included in the Business Plan.
- Incorporate correction for extraordinary events (where necessary).

4.3.5 The Licence prescribes three (3) "quality indices" for the determination of the Q-Factor, SAIFI, SAIDI and CAIDI, which are defined in Schedule 3, Exhibit 1 of Licence.

This data set is critical to the regulatory review process as it involves the validation of JPS's proposed reliability indicators, required for the establishment of the Q-Factor baseline and by extension, the implementation of the Q-Factor incentive scheme. JPS's response to these issues will be critical in setting the final criteria for the Q-Factor to be used in the 2019 – 2024 Rate Review. Considering this, the OUR has provided additional information with respect to the data improvement strategy and the Outage Management System (OMS) data quality and process improvements for 2019-2024 Rate Review in Annex 2 herein.

4.3.3 The Licence prescribes three (3) quality indices for the determination of the Q-Factor, SAIFI, SAIDI and CAIDI. The definitions of these indices, as set out in the Licence, are consistent with the accepted IEEE Standard 1366 – 2012 and the "IEEE Guide for Electric Power Distribution Reliability Indices" (IGEPDR)4.3.6 Based on established regulatory principles, the Q-Factor should not penalize JPS for factors that are outside its control, such as IPP generation outages, unless the cause of the IPP generation outage(s) is/are due to fault(s) on the part of JPS.

4.3.7 Having regard to these regulatory provisions and the requirements of Schedule 3, paragraph 39 of the Licence, the OUR has developed the criteria for setting the Q-Factor targets, which are summarized in criterion 11 below.

4.3.8 In respect of criterion 11, the specific requirements/procedures that should be employed in the development and justification of the 2024-2029 Q-Factor proposal, as well as the framework for evaluation and determination of the prescribed Q-Factor targets, are set out in Annex 2 of this Criteria.

Criterion 11:

a) The 2024-2029 Q-Factor proposals must meet all the relevant qualitative/quantitative requirements outlined in Annex 2 of this Criteria.

b) The Q-Factor baseline established for 2024-2029 should be the reference measurement for development of the 2024-2029 system reliability performance forecast and for setting the annual Q-Factor targets to be applied in the PBRM during the Rate Review period.

c) JPS's 2024-2029 Rate Review Application shall include the following contents and information:

1. Proposed reliability performance forecast (SAIFI, SAIDI, and CAIDI) for 2024-2029.

2. Proposed annual Q-Factor targets (SAIFI, SAIDI and CAIDI) for the full five (5) years in the 2024–2029 Rate Review period. That is, the proposed Q-Factor targets shall be represented as follows:
    i. Target for 2024 – to be applied at 2025 Annual review.
    ii. Target for 2025 – to be applied at 2026 Annual review.
    iii. Target for 2026 – to be applied at 2027 Annual review.
    iv. Target for 2027 – to be applied 2028 Annual review.
    v. Target for 2028 – to be applied at the 2029-2023 Rate review.

3. The supporting Q-Factor schedules/datasets, study reports, calculations, simulation models/files, and other relevant system operations information, to justify and substantiate the 2024-2029 reliability performance projections and Q-Factor target proposals.

4. The methodology used to develop the 2024-2029 reliability projections and Q-Factor targets.

5. The proposed system reliability improvement reduction plan for 2024-2029.

6. A detailed report on the status of the system reliability projects approved for implementation during the 2019-2024 review period, up to 2023 December, covering the scope, costs, benefits, and the resulting loss reduction impact, in each case.

4.4 Y-Factor (System Losses) Adjustment

4.4.1 In all previous Rate Reviews conducted by OUR, the methodology for determining JPS's system losses target was predicated on a simple system that distinguished the technical losses target from the non-technical target and the application of the established target to the company's fuel rate. With the introduction of the Licence in 2016, a new approach to the establishment of the system losses targets has been established. In essence, this new methodology:

- Recognizes that JPS is not completely responsible for all of the non-technical losses, as there is a socioeconomic dimension to this aspect of losses;
- Does not allow JPS system losses incentive/penalty payment to fluctuate with the vagaries of the fuel market. As such, the losses incentive/penalty mechanism is now anchored to the non-fuel tariff rather than the fuel tariff; and
- Allows for annual rather than monthly incentive/penalty adjustments.

4.4.2 In keeping with Schedule 3 of the Licence, the system losses differential between the target and the actual has been disaggregated into three components:

a) Technical losses (Ya): TL
b) Non-technical losses fully under JPS' control (Yb): designated "JNTL"
c) Non-technical losses partially under JPS' control (Yc): designated "GNTL"

4.4.3 The Responsibility Factor (RF) is critical to the determination of the portion of the non-technical losses under Yc for which JPS is held accountable. The portion of system losses for which JPS is held accountable is the product of Yc and the Responsibility Factor[13]. The total system losses for which the company is held accountable, may be expressed in percentage term as:

$$Y_{y-1} = Ya_{y-1} + Yb_{y-1} + Yc_{y-1}$$

Where:

Ya_{y-1} = (Technical losses target – Actual Technical losses)

Yb_{y-1} = (Controllable Non-technical losses target – Actual controllable non-technical losses)

Yc_{y-1} = (Partially controllable non-technical losses target – Actual partially controllable non-technical losses) * RF

And, y-1 refers to the event in the previous year

[13] See Annex 3 for further information on the definition of system losses

4.4.4 In translating system losses to a monetary value, the total system losses differential (Y_{y-1}) must be multiplied by Actual Revenue Target in the previous year (ART_{y-1}) which may be expressed as:

$$TULosy\text{-}1 = Y_{y-1} * ART_{y-1}$$

4.4.5 Notably, the system losses adjustment construct delineated above is a symmetrical incentive/penalty mechanism. If JPS underperforms, it will be penalized since its revenues would be reduced. Alternatively, if the company out-performs the targets in aggregate terms, then it will receive additional compensation by way of higher revenues.

4.4.6 According to Schedule 3, paragraph 37 of the Licence, the Office is empowered to set system losses targets for JPS, which should:

- Be reasonable and achievable;
- Take into consideration the Base Year and historical performance;
- Take into account the agreed resources included in the Business Plan;
- Incorporate correction for extraordinary events (where necessary);
- Give due recognition of the role of the GOJ in addressing the non-technical aspect of the system losses that are not entirely within the control of JPS.

4.4.7 Having regard to these regulatory provisions and the requirements of Schedule 3, paragraph 38 of the Licence, the OUR has developed the criteria for setting the system losses targets, which are summarized in criterion 12 below.

4.4.8 In respect of criterion 12, the general areas of focus and the specific requirements/procedures that should be employed in the development and rationalization of the 2024-2029 system losses proposal, as well as the framework for evaluation and determination of the prescribed system losses targets, are set out in Annex 3 of this Criteria.

Criterion 12:

a) The 2024-2029 system losses target proposals must meet all the relevant qualitative/quantitative requirements outlined in Annex 3 of this Criteria.

b) The validated system losses level for the base year (2023 calendar year) will be the reference point for the 2024-2029 system losses forecast and corresponding annual targets, and the loss reduction trajectory for the 2024-2029 price control period.

c) JPS's 2024-2029 Rate Review Application shall include the following contents and information:

1. Proposed system losses forecast (TLs, JNTL and GNTL) for 2024-2029.

2. Proposed annual system losses targets (TLs, JNTL, GNTL and RF) for the full 5 years in the 2024 – 2029 Rate Review period. Where, the proposed losses targets shall be represented as follows:
    i. Target for 2024 – to be applied at 2025 Annual review.
    ii. Target for 2025 – to be applied at 2026 Annual review.
    iii. Target for 2026 – to be applied at 2027 Annual review.
    iv. Target for 2027 – to be applied 2028 Annual review.
    v. Target for 2028 – to be applied at the 2029-2023 Rate review.

3. Proposed annual system losses for the following five (5) year (2029–2034) to satisfy the "rolling" ten (10) year target requirement stipulated in Schedule 3, paragraph 38 of the Licence.

4. The supporting system losses schedules/datasets, ELS, study reports, calculations, simulation models/files, and other relevant system losses information, to justify and substantiate the 2024-2029 system losses projections and target proposals.

5. The methodology used to develop the 2024-2029 system losses projections and proposed targets.

6. The proposed system losses reduction plan and proposed methodology to manage on the financial impact of Y-Factor.

7. The 2024-2029 A detailed report on status of the system losses reduction projects (TLs and NTLs) approved for implementation during the 2019-2024 review period, up to 2023 December, covering the scope, costs, benefits, and the resulting loss reduction impact, in each case.

4.5 Z-Factor Adjustment for Capital Investment

4.5.1 In general, the Z-Factor addresses adjustment to the annual Revenue Requirement arising from 'special circumstances'.[14]Given the sensitivity of revenue cap mechanism to capital cost, further clarifications concerning the treatment of JPS's investments over the 2024-2029 Rate Review period is necessary.

4.5.2 JPS's capital investment projects shall be classified into three (3) categories as stated below, a more detailed classification is provided in section 7 of this Final Criteria:

a) *Major Projects*: this refers to non-routine capital projects valued at US$10 Million or more. These projects shall be clearly identified in JPS's capital investment plan, but shall be assessed for Z-Factor adjustments on their individual merit;

b) *Extraordinary Maintenance Projects*: this refers to capital projects related to routine plant replacements and overhauls valued at US$10 Million or more. These projects shall be clearly identified in JPS's capital investment plan, but shall be assessed for Z-Factor adjustments on their individual merit;

c) *Minor Projects*: this refers to non-routine capital projects valued at less than US$10 Million. These projects shall be clearly identified in JPS's capital investment plan but shall be assessed for Z-Factor adjustments collectively.

4.5.3 In order to ensure that the annual assessment of capital projects is consistent, fair and unambiguous, JPS is required to submit its capital investment projects in the Business Plan in a manner that conforms to the guidelines specified in section 7 of this document. Furthermore, if any project straddles two (2) or more Annual Review periods the following shall apply:

- the full capital investment cost should be clearly stated
- the activities and cost component belonging to each annual review period identified; and
- project costs associated with the current review period only shall be included in the tariff.

4.5.4 Z-Factor adjustments to the Revenue Requirement triggered by the assessment of JPS's capital projects shall involve adjustments to the original depreciation expense and the rate of return on investment while giving due consideration to the time value of money.

Cumulative Assessment

4.5.5 At the time of an Annual Review the cumulative expenditure for the project should be considered. If the cumulative expenditure varies within ± 5% then no Z factor adjustment

[14] "Special circumstances" is defined in Paragraph 46 (d)(i) of Schedule 3 of the Licence

will be required. However, if the variation is greater than ± 5% then the conditions applicable to the annual adjustments specified below are applicable.

Project Delays

4.5.6 The Z-Factor adjustment shall be triggered where there is a delay in a Major Project or an Extraordinary Maintenance Project in any given year that results in variation of at least 5% of the annual expenditure for each project category.

4.5.7 The Z-Factor adjustment shall be triggered where there is a delay in Minor Projects as a whole, in any given year that results in variation of at least 5%, of the annual expenditure for minor capital projects.

Unimplemented Projects

4.5.8 If for any justifiable reason, JPS decides that it is no longer necessary to implement an approved project in the Business Plan during the prevailing Rate Review period, a Z-Factor adjustment shall be made to remove the associated project cost from the Revenue Requirement.

Unplanned Projects

4.5.9 Where there is a need for a Major Project or an Extraordinary Maintenance Project in any given year, which was not envisaged in the approved Business Plan, and if such a project results in an increase in capital expenditure greater than 10% of the projected capital expenditure for that given year, then the project shall trigger a Z-Factor adjustment. The determination whether the unplanned project is needed, or required, is subject to the OUR's approval.

Changes in Project Scope

4.5.10 Where there is a change in the scope of Major Project or an Extraordinary Maintenance Project in any given year that results in a reduction in the project cost by at least 10% of the projected capital expenditure, a Z-Factor adjustment shall be made. The Z-Factor adjustment shall result in 50% of the savings being passed on to customers for the remainder of the Rate Review period. Any change in the scope of a project shall be subject to the OUR's approval.

Treatment of the Transition for Five-Year Tariff Reviews

Final Year of Review

4.5.11 In the final review year the treatment of JPS's capital projects shall be no different from the treatment specified for the other years in the five (5) year Review period. Should adjustments be required based on the established Z-Factor criteria the monetary value of such adjustments shall be made in the Revenue Requirement of the first year of the new five (5) year Rate Review period.

Criterion 13:

In the Annual Review, a Z-Factor adjustment arising from JPS's capital investment plan may be triggered by:

- Cumulative Assessment
- Unimplemented projects
- Changes in project scope
- Project Delays
- Unplanned projects; and

In the treatment of these special circumstances, the following procedures must be observed:

a) At the time of an Annual Review the cumulative expenditure for the project should be considered. If the cumulative expenditure varies within ± 5% then no Z factor adjustment will be required. However, if the variation is greater than ± 5% then the conditions applicable to the annual adjustments, in the following points becomes applicable.

b) Delays in the implementation of specified capital projects (Major Projects or Extraordinary Maintenance Projects) that result in a variation in expenditure of 5% or more of the annual expenditure for the project category in any given year, shall trigger a commensurate Z-Factor adjustment to the tariff in the following year.

c) If for any reason, JPS does not undertake an approved capital project in the Business Plan, a Z-Factor adjustment shall be made to remove the associated project cost from the Revenue Requirement.

d) Should a Major Project or an Extraordinary Maintenance Project arises and JPS demonstrates that such an expenditure could not have been reasonably anticipated, and the cost is greater than 10% of the projected capital expenditure for any given year relative to the previously agreed Business Plan, a commensurate adjustment to the tariff in the following year shall be made with the Office's approval.

e) In the event of a change in the scope of a Major Project or an Extraordinary Maintenance Project in any given year that results in at least a 10% reduction in the original capital cost, the savings derived shall be shared in a 50:50 ratio with customers. Accordingly, this shall trigger a commensurate reduction in the tariff via the Z-Factor mechanism. Any change in scope of a project shall be subject to the OUR's approval.

Criterion 13 (Continued):

d) In the final review year, the treatment of JPS' capital projects shall be no different from the treatment specified for the other years in the five (5) year Review period. Should adjustments be required based on the established Z-Factor criteria the monetary value of such adjustments shall be made in the Revenue Requirement of the first year of the new five (5) year Rate Review period.

e) To facilitate the calculation of the adjustments to capital in the Annual Review process JPS shall be required to submit:

   i. For each of the Major Projects and the overall Minor Projects the portion of the cost capitalized in the year specific to the Review.

   ii. Semi-annual reports to the OUR, to communicate changes to the annual investment portfolio. This will include projected revenue requirement adjustments and projected impact on performance metrics.

5. HEAT RATE, H-FACTOR AND FUEL TARIFF

5.1 Fuel Tariff

5.1.1 Fuel accounts for a significant portion of the cost associated with the production of electricity, particularly given the fact that approximately 87% of electricity generation in Jamaica come from imported fossil fuel sources. In this regard, the total fuel cost is sensitive to the volatility of global fuel prices and the instability of the Jamaican dollar on foreign exchange markets. Given the degree of this risk, fuel costs net of efficiency adjustments is passed through directly to electricity customers via the monthly tariff on a per kilo-watt-hour (kWh) basis.

5.1.2 Schedule 3, Exhibit 2 of the Licence states that the fuel cost per kilo-watt-hour (net of efficiencies) shall be calculated monthly based on the *"total fuel computed (inclusive of fuel additives) to have been consumed by the Licensee and Independent Power Producers (IPPs) in the production of electricity"*.

5.1.3 The equation as outlined in the Licence is as follows:

$$F = \frac{F_m}{S_m}$$

Where:

$\boldsymbol{F}$	=	Monthly Fuel Rate in J$ per kWh rounded to the nearest one-hundredth of a cent applicable to bills rendered during the current Billing Period[15]
$\boldsymbol{F_m}$	=	Total applicable energy cost per period
$\boldsymbol{S_m}$	=	the kWh sales in the Billing Period.

The kWh sales in the billing period is the actual kWh sales occurring in the previous calendar month.

[15] See Annex 4 for the components of the fuel cost pass through

5.2 H-Factor (Heat Rate) Adjustment

5.2.1 The OUR will evaluate the heat rate in accordance with Schedule 3, paragraphs, 37, 39 and 40 of the Licence taking into consideration the system conditions and plans for the Rate Review period. Accordingly, the Fuel Cost Adjustment Mechanism (FCAM) sets a heat rate performance target for the conversion of fuel to energy for JPS. The FCAM operates as a symmetrical incentive mechanism which allows JPS to benefit financially if it outperforms the heat rate target (i.e., register a lower actual heat rate) and penalizes the company for under-performing (i.e., register a higher actual heat rate).

5.2.2 Under the FCAM, the monthly Fuel Cost Pass Through ($\boldsymbol{F_m}$) is:

$$\boldsymbol{F_m = [IPPs\ Fuel\ Cost + (JPS\ Fuel\ Cost \times H)]}$$

Where the H-Factor is:

$$H = \left(\frac{\boldsymbol{JPS\ Heat\ Rate\ Target\_Thermal}}{\boldsymbol{JPS\ Heat\ Rate\ Actual\_Thermal}}\right)$$

5.2.3 Based on FCAM formula above, the monthly derived fuel rates allow JPS to pass through its monthly total fuel costs to electricity customers on a dollar-for-dollar basis subject to efficiency adjustment by the H-Factor. The calculated monthly rates are also adjusted to account for movements in the exchange rate between the United Sates dollar (USD) and the Jamaican dollar (JMD).

5.3 H-Factor (Heat Rate) Evaluation

5.3.1 For a complete evaluation of JPS's heat rate and H-Factor proposals included in the 2024-2029 Rate Review Application, the OUR's approach will encompass the scope and objectives set out below:

1) An initial review of JPS's 2024-2029 heat rate and H-Factor proposals and all supporting schedules to ascertain adequacy and completeness within the allowed 10-working day period after the submission date of the 2024-2029 Rate Review Application (Schedule 3 paragraph 7 of the Licence), to determine acceptability of the Rate Application.

2) Upon acceptance of JPS's 2024-2029 Rate Review Application by the Office, the OUR will embark on a comprehensive technical evaluation of the proposals in accordance with the legal and regulatory framework, to:
   a. validate whether JPS's heat rate forecast and proposed heat rate targets, meet the "reasonable and achievable" condition, and are consistent with the configuration and operating capability of the electricity system, assumed by the company for the subject review period.

   b. assess JPS's heat rate performance during the 2019-2024 review period. The findings from this review will inform the OUR's determinations on the heat rate targets for the 2024-2029 Rate Review period.

   c. Evaluate/analyze JPS's 2024-2029 heat rate and Y-Factor proposals to support the setting of the annual targets, as required by the Licence.

3) The OUR's evaluation of JPS's 2024-2029 heat rate proposals will be based on detailed "technical-economic" and statistical evaluation/analyses, in order to determine heat rate targets for the company that are "reasonable and representative", and consistent with the configuration and capability of the electricity system. And also, to provide a reasonable incentive to the company to improve fuel conversion efficiency of the generation system.

4) The OUR's heat rate evaluation will be carried out using the heat rate datasets/schedules, heat rate model, heat rate assessment reports, software simulation files provided by JPS, other available system operations data, and with the application of established methods, models, and tools.

5) Generation simulations and analyses will be conducted based on economic generation dispatch principles, taking into consideration credible generation and transmission network constraints.

5.3.2 In this regard, JPS will be required to submit detailed information, among other things, in relation to system load (net generation and peak demand), generation system, transmission system, and the generation dispatch process.

5.3.3 To facilitate the OUR's evaluation/analysis of JPS's 2024-2029 heat rate proposals, to inform the setting of the relevant heat rate targets for the price control period, the company is required to satisfy the heat rate and Y-Factor requirements, outlined in **Annex 4** of this Criteria.

Criterion 14:

a) The 2024-2029 heat rate proposals must meet all the relevant qualitative/quantitative requirements outlined in Annex 4 of this Criteria.

b) JPS's 2024-2029 Rate Review Application shall include the following contents and information:

   i. The projected 2024-2029 heat rate performance forecasts and proposed targets for each discrete 12-month period (July – June) of the Rate Review period.

   ii. Supporting documentation, calculations, datasets/schedules, heat rate models, generation assessment reports, software simulation files, and relevant data used to support its proposed 2024-2029 heat rate projections and corresponding targets.

c) The methodology (thermal, individual plant, or other such methodologies) used by the company to derive the projected monthly heat rates and targets for 2024-2029.

6. SUPPORTING DOCUMENTS

6.1 Business Plan

6.1.1 In light of the forward-looking nature of the revenue cap regime, JPS rates are to be set based on the company's five (5) year outlook outlined in the Business Plan. This is critical for three (3) main reasons:

a) It provides JPS with a tool that aligns its activities with its goals within the regulatory framework;

b) It is a means of holding the company accountable for its actions in the Rate Review period;

c) It provides an objective basis for the regulator to assess whether the utility is efficient in the management of its resources and prudent in its operations.

6.1.2 It is expected that the Business Plan will present a market analysis, sales and customer service strategies, a corresponding funding requirement and a financial projection. Table 3 below shows some of the issues the OUR expects JPS to address in the Business Plan.

Table 3 – Suggested Features to be Included in JPS' Business Plan

FEATURES	COMPONENTS
Performance Review	• Operational Performance – Reliability, Quality, Heat Rate, System Losses • Asset Performance – Production, T &D Plant maintenance and asset condition • Efficiency – Organization and Financial Performance
Strategic Direction of the Utility	• Assessment of Current Conditions and Priority Issues • Strategic Goals • Alignment with Customer Needs • Key Planning Assumptions
Service Obligations and Target Outputs	• Customer Satisfaction, Reliability, Heat Rate, Losses Targets • Other Business KPIs

Capital Expenditure and Investment Forecast	• Capital Program Summary
	  ○ Generation
	  ○ Transmission
	  ○ Distribution
	  ○ IT
	  ○ General Plant
	• Program Development and Investment Drivers (e.g., growth, replacement/maintenance, enhancements, statutory, efficiency improvement)
	• Program Development Methodology
	• Cost Estimation Methodology
	  ○ Capital cost estimation
	• Key Assumptions
	• Large Projects Justification
	  ○ Description of Project
	  ○ Substantiated Need for Project
	  ○ Analysis of Options
	  ○ Cost Estimate
	  ○ Rate Impact and other Customer Impacts

Operations and Maintenance Budget Forecast	• Overview of Budgeted O&M Cost Components (e.g., Payroll & Employee Benefits, Third Party Services etc.) • HR Resource Strategy • Procurement Strategy
Financial Strategy	• Financing Requirements • Financing the Plan • Risk and Uncertainty Management
Customer and Stakeholder Impact	• Bill Impact • Other Customer Benefits/Cost

6.1.3 In addition, for regulatory purposes, the Business Plan shall conform to the conditions delineated in Schedule 3, paragraph 13 of the Licence.

Criterion 15:

b) JPS shall submit a Business Plan predicated on a five (5) year time horizon and this Plan shall be the basis for the Rate Review Process.

c) Consistent with Schedule 3, paragraph 13 of the Licence, the Business Plan shall include but not be limited to the following:

i. The matters listed in the published criteria;

ii. The most recent IRP;

iii. Investment activities;

iv. System loss mitigation activities and related funding requirements;

v. Grid Security;

vi. Annual targets for losses (Y-Factor), heat rate (H-Factor) and quality of service (Q-Factor);

vii. Operating and maintenance expenses;

viii. Smart technologies, efficiency, and other policy initiatives; and

ix. Projections of the company's balance sheet, profit and loss statement and cash flow statement.

6.2 Financial and Regulatory Accounts

6.2.1 Critical to the effective regulation of infrastructure services, such as electricity, is a framework which facilitates the periodic publication of accounting statements that explicitly support the regulatory function. In modern utilities, financial reporting involves the presentation of aggregate information that is designed primarily to meet the needs of management and shareholders. These reports, while useful in a general way, do not provide sufficient details for the regulator. Consequently, it is essential that utilities generate reports that allow for the analysis of costs and revenues, as well as the evaluation of assets employed, in a way that is consistent with effective regulation.

6.2.2 According to Condition 5(2) of the Licence:

"*The Licensee shall maintain such Regulatory Accounts as may reasonably be specified by the Office consistent with generally accepted accounting principles and the EA*[16]."

Section 46 of the Electricity Act, 2015 provides that JPS *"…shall, at all times, keep the accounts for its generation, transmission, distribution and activities separate and distinct from each other and from accounts kept by it in respect of any other part of its undertaking or business."*

6.2.3 The provisions of the Licence require JPS to include its Rate Review application, the latest audited financial accounts.[17] In previous Rate Reviews, JPS consistently included its latest audited financial report as a part of its rate submission. For the 2024 -2029 Rate Review, JPS shall submit, along with its Audited Financial Accounts, a set of Regulatory Accounts for 2023. The Regulatory Accounts shall be consistent with the Accounting Cost Allocation Manual approved by the OUR.

Criterion 16:

JPS shall submit in its 2024 – 2029 Rate Review application its:

a) 2023 Audited Financial Accounts

b) 2023 Regulatory Accounts

6.3 Cost of Service & Load Research Studies

6.3.1 The starting point in assessing the reasonableness of the rates to be charged by a utility is to evaluate the cost of providing the services, that is, through a cost-of-service study. The objective of the cost-of-service study is to apportion all costs required to serve customers among each customer class in a fair and equitable manner. There are two broad approaches to conducting a cost-of-service study: (1) the embedded cost of service approach, and (2) the marginal cost of service approach.

6.3.2 An embedded cost of service study takes the total Revenue Requirement and allocates it among customer classes. The marginal cost study analyzes how the cost of the System would change to provide an incremental increase in service. Typically, marginal cost is below average cost and thus, pricing at marginal cost would not allow the utility to recover

[16] EA refers to the Electricity Act, 2015

[17] Schedule 3, paragraph 17 of the Licence and the definition of Base Year.

its full cost. Therefore, a revenue reconciliation to the approved Revenue Requirement of the company is also required.

6.3.3 Economic theory suggests that rate design should be based on marginal cost since it provides efficient price signals. This is consistent with the approach that the OUR has promulgated for rate design in previous Rate Review determinations and, as such, JPS is required to submit a long run marginal cost (LRMC) cost of service study to support its tariff design in the 2024 – 2029 Rate Review application.

6.3.4 The LRMC cost of service study shall include:

a) The LRMC of generation, transmission by feeder type and distribution by feeder type and distribution medium and low voltage and the supply of one unit of additional capacity to the power system at the peak period by main voltage levels

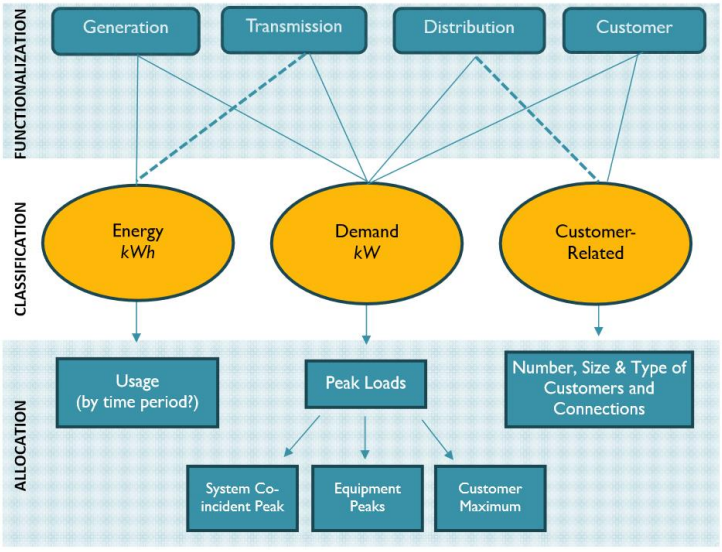
b) The short run marginal cost (SRMC) (energy and other variable O&M) at generation, transmission, and at distribution and supply

c) The economic cost of supply (covering customer service and facilities and administration and general function), expressed as (a) capacity cost (cost/kw/year) or/and fixed charge per month, (b) energy and other variable O&M cost (cost/kWh), and (c) as a composite of (a) and (b) cost/kWh at generation, at transmission, at distribution and supply; and

d) The process for marking up the marginal cost to allow for full cost recovery.

6.3.5 JPS shall also submit an embedded cost of service study, which shall be used to establish average costs for each rate class. Both the embedded and the LRMC cost of service study shall include detailed reports on the cost functionalization, classification and allocation process of the major electricity system components as illustrated in Figure 02 below.

Figure 02: Functionalization, Classification and Allocation Process



6.3.6 JPS shall also establish a load research programme to determine cost allocation factors, which will be used in both the embedded and LRMC cost of service studies. In carrying out its load research programme, JPS should ensure that interval data recorders (meters), which will enable the statistical estimation of demand by hour for each rate class, are installed at the premises of a selected sample of customers in each rate class. The samples shall be selected to ensure, at minimum, a relative precision of peak hour demand estimate of plus or minus 10% at a 90% confidence level.

6.3.7 In submitting its Rate Review application, JPS shall submit a load research study report utilizing at least twelve (12) months of load research data to justify the computation of cost allocation factors such as class coincident peak demand, class non-coincident peak demand and other relevant data required to establish cost allocation factors.

Criterion 17:

JPS shall submit as part of its 2024 – 2029 Rate Review application:

a) An Embedded Cost of Service study which clearly shows cost allocations that reflect the functionalization and classification of cost, as well as the costs associated with its non-regulated business.
b) An Embedded Cost of Service allocation based on the proposed revenue cap for 2024.
c) A study done on a bottom up Long Run Marginal Cost basis with reconciliation to the revenue cap for 2024.
d) A load research study report detailing the sampling technique and methodology used in its programme as well as an analysis of the structure of demand over a typical day (weekdays, Saturday, and Sunday) for each rate class.

7. GUIDELINES FOR REVIEWING PROJECTS IN THE BUSINESS PLAN

7.1 Project Proposal Information Requirements

7.1.1 All the capital projects proposed in the Business Plan, shall be classified into the following three (3) categories:

a) *Major Projects*: this refers to non-routine capital projects valued at US$10 Million or more. These projects shall be clearly identified in JPS's capital investment plan and shall be assessed for Z-Factor adjustments on their individual merit.

b) *Extraordinary Maintenance Projects*: this refers to capital projects related to routine plant replacements and overhauls valued at US$10 Million or more. These projects shall be clearly identified in JPS's capital investment plan and shall be assessed for Z-Factor adjustments on their individual merit. The only distinction between a Major Project and an Extraordinary Maintenance Project is that the former is non-routine in nature while the latter is not; and

c) *Minor Projects*: this refers to non-routine capital projects valued at less than US$10 Million. Each Minor Project shall be clearly identified in JPS's capital investment plan; however, the projects shall be assessed for Z-Factor adjustments collectively (i.e. based on the performance of all projects in the Minor Project category as a whole).

7.1.2 Projects with expenditure already in construction work in progress (CWIP) prior to 2024, and slated to be commissioned in 2024, shall be excluded from all categories of capital projects identified above.

7.2 JPS shall provide plausible justification for all the elements of its capital investment plan. The projects shall be guided by one or more of the following objectives:

1. **Efficiency**: Improvement of JPS's key business activities through the installation of new assets and advanced systems that result in cost reduction and the enhancement of reliability (such investment would include loss reduction and reliability improvement strategies).
2. **Growth**: Capital additions and system reconfigurations designed to serve incremental system demands. This includes additional connection requirements such as extension of the power delivery systems to facilitate new connections.
3. **Maintenance/Replacement**: Investments to maintain the current productive capacity of the assets through preventative, predictive and corrective measures.
4. **Statutory**: Capital expenditures required to comply with relevant electricity sector regulation and statutory requirements in the operation of the power system.

5. **Upgrade**: Capital expenditures to improve or extend the capacity of existing assets to better meet system demand.

7.3 In the Business Plan, JPS shall provide the information summarized in Table 4 below for the three (3) project categories identified above.

Table 4 – Project Classification and Information Matrix

Project Type	A Description of Facilities	B Specification & Design	C Project Site	D Implementation Schedule	E Cost Estimate	F Models	G Risk	H Procurement Activites
Major Project								
Efficiency	✓	✓	✓	✓	✓	✓	✓	✓
Growth	✓	✓	✓	✓	✓	✓	✓	✓
Replacement	✓	✓	n/a	✓	✓	✓	✓	✓
Statutory	✓	n/a	n/a	✓	✓	✓	n/a	✓
Upgrade	✓	✓	✓	✓	✓	✓	✓	✓
Extraordinary Maintenance Projects								
Routine Replacement	✓	n/a	n/a	✓	✓	✓	✓	n/a
Overhaul	✓	n/a	n/a	✓	✓	✓	✓	n/a
Minor Projects								
Efficiency	✓	✓	✓	n/a	✓	✓	✓	n/a
Growth	✓	✓	n/a	n/a	✓	n/a	✓	n/a
Replacement	✓	n/a	n/a	n/a	✓	n/a	✓	n/a
Statutory	✓	n/a	n/a	n/a	✓	n/a	n/a	n/a
Upgrade	✓	✓	n/a	n/a	✓	✓	✓	n/a

7.4 JPS should provide adequate information in its Annual Review filling to allow the OUR to accurately assess the capital expenditure, the degree of project implementation and the cost, time and design deviations from the original plan.

Components of Project Proposal Information Requirements

7.5 Consistent with the information in the matrix above, JPS shall, depending on the specific project category, provide the information set out below shall be provided in the filing of in its 2024-2029 Rate Review application.

Description of Facilities:

7.6 JPS shall be required to set out the following for each project:

a) Justification for the project.

b) Project scale, scope, and timing.

c) Description of proposed technology and track record of proposed technology in similar operating environment (for new technologies that JPS has not implemented in the past).

d) Major systems, sub-systems, and type of equipment.

Specifications and Design

7.7 With regard to the specification and design of the project, the following information is required for projects geared towards efficiency, growth and upgrade:

a) Proposed design and configuration.

b) Specifications for the proposed project facilities, including specifications for the major systems and equipment including, manufacturer, model, ratings, and applicable codes/standards.

c) Available drawings and general layout plans relating to the proposed project facilities.

Project Site

7.8 With regard to project site, the following details are required:

a) Location.

b) Description of the project site, including maps and data.

c) Description of access route to project site.

Proposed Implementation Schedule

7.9 The details of the schedule for all the Major projects shall include:

a) All project tasks, milestone activities, timelines, and resources, to support and confirm project progress and completion within the proposal timeframe.

b) A functional electronic "Gantt Chart" compatible with Microsoft Projects software.

7.10 A summary schedule showing the major milestones of the project shall be provided for all Extraordinary Maintenance Projects.

Project Cost Estimate

7.11 The following information is required for the proposed project capital cost:

a) Description of methodology used to estimate the capital cost of each project and the justification of such cost estimates.

b) The proposed capital cost should be disaggregated into the major capital cost components, including any capitalized operation and maintenance (O&M) costs and contingency costs. This should also be reflected in the project model.

c) The major capital cost components should be fully broken out into their constituent elements, particularly the construction cost.

d) Documentation providing evidence of the scope of supply and services from proposed vendors and suppliers, including price quotations, where applicable.

Project Models

7.12 For all Major and Minor Projects that were justified by the category of upgrade or efficiency and Extraordinary Maintenance Project proposals, JPS shall include the following project models developed in Microsoft Excel.

a) *Financial/Economic Analysis Model:* This model should include, financial/economic assumptions, methodology, sensitivity analysis, Internal Rate of Return (IRR), Net Present Value (NPV), etc., and analysis demonstrating the economic and financial feasibility of the proposed project.

b) *Cost-Benefit Analysis Model:* This should include project-specific cost-benefit analysis demonstrating the cost effectiveness and value of the proposed project to the electricity system.

c) *Rate Impact Assessment (RIA) Model:* A project's RIA model should analyze and show the impact of a proposed project on average retail electricity rates.

Project Risk Assessment and Due Diligence

7.13 Major projects and minor projects, excluding projects justified on statutory grounds, and Extraordinary Maintenance Projects shall include:

a) Description of potential risks that could impact the implementation and operation of each proposed project.

b) Proposed mitigation strategies to address project risks.

c) Sensitivity analysis using project models and contingency analysis for risk assessment to inform decision-making.

Procurement Activities

7.14 Procurement activities to support the implementation of approved projects shall be consistent with the following:

a) Procurement activities shall be transparent, reasonable, and prudent.

b) In procuring such services, JPS shall endeavour to employ competitive tender processes consistent with national guidelines, international standards, and industry best practices.

c) The procurement approach for each Major project, shall encompass specific sets of technical and commercial requirements with clearly defined evaluation/selection criteria.

d) For transparency and regulatory monitoring purposes, the OUR reserves the right to request JPS to submit the evaluation report at the time of procurement of approved projects.

Project Implementation Requirements

7.15 After receiving the OUR's approval, but prior to the implementation of the Major and Extraordinary Maintenance projects, the following details of each project should be provided if they were not presented in the Five-Year Rate Review submission.

Project Logistics

7.16 In its submissions JPS shall provide:

a) Details of proposed arrangements for supply, installation, and commissioning of Major and Extraordinary Maintenance Projects.

b) Evidence of relevant arrangements to ensure the availability of the required inputs to support the proper and timely implementation of a project.

Engineering, Procurement and Construction (EPC) Arrangements

7.17 Where applicable, the OUR may request that JPS provide information on its Engineering, Procurement and Construction (EPC) Arrangements for certain projects. The information would include:

a) Details of potential Engineering, Procurement and Construction (EPC) arrangements;

b) Experience of EPC contractors; and

c) Qualifications and experience of project team.

7.18 Notwithstanding JPS's responsibility to provide relevant and comprehensive updates on the implementation of the approved Business Plan projects in its Annual Review submissions, the company is required to notify the OUR as soon as it recognizes that there will be a major delay, abandonment or change in the scope of a project.

Initial Year of New Review Period

7.19 To facilitate the smooth transitioning of the five (5) year Rate Reviews given the time lags between the actual Rate Review exercise and the implementation of the tariff, the following shall be done for the first year of the new review period:

a) JPS shall submit at the time of the final Annual Review in the current five-year rate review period, a provisional three (3) year capital expenditure plan, which shall conform to the following:

i. Justification and cost of the project

ii. Overall project duration
iii. Description of the various components and associated costs
iv. Cost-benefit analysis
v. Implementation time of the project and its components

b) The OUR shall assess the provisional Plan submitted by JPS and grant interim approval of the capital expenditure for the first year of the upcoming Five-Year Rate Review. However, if there is any deviation, the reconciliation will be done during the review process for the Five-Year Rate review.

Regulatory Monitoring of Approved Projects

7.20 The implementation of approved projects will involve several milestone activities expected to be completed within defined timeframes. As such, there will be a need for on-going regulatory monitoring, up to the point of commercial operations. After successful project implementation, monitoring will shift to the operations phase. JPS shall submit to the OUR the semi-annual status update on all projects showing, among other things, major milestones achieved, and breakout of costs incurred during projects implementation. This status update becomes due twenty (20) workdays within the month of July.

Criterion 18:

JPS shall adhere to the guidelines for reviewing of proposed projects in the Business Plan outlined in this section of the Final Criteria.

8. CONSTRUCTION WORK IN PROGRESS (CWIP)

8.1 The construction work in progress (CWIP) represents the balance of funds invested in utility plants under construction, that are not yet in service. As stated in Schedule 3, paragraph 29 (a) of the Licence, the Rate Base should be calculated using Property, Plant and Equipment ("PPE"), inclusive of construction in progress. This condition allows JPS to recover a portion or all of the carrying costs of new plant assets being built prior to the plant actually entering service. However, with the inclusion of CWIP in the Rate Base, accruals for "allowance for funds used during construction" (AFUDC), which accounts for Interest During Construction (IDC) will not be allowed and will be excluded from the Revenue Requirement.

8.2 CWIP shall only be included for projects that will result in items of PPE, subject to the asset recognition principle under International Accounting Standard (IAS 16), which is included in the International Financial Reporting Standards (IFRS). The determining factor of whether an activity will require processing as CWIP depends on whether tangible assets are involved, and the project is to be capitalized.

8.3 For the evaluation of the proposed Rate Base for the 2024-2029 Rate Review Process, the projected costs for the CWIP, to be included in the company's PPE as prescribed by the Licence, shall be supported by an adequate and structured CWIP schedule, encompassing all plants/facilities under construction.

Criterion 19:

a) JPS shall submit in the Business Plan a Construction Work in Progress (CWIP) schedule. This schedule shall allow for easy tracking of CWIP and shall include, but not be limited to, the following:

i. A description of all plants/facilities under construction.
ii. Construction commencement date.
iii. Project status.
iv. Percentage completion.
v. Projected commercial operation date (COD).
vi. The capital cost of each project.
vii. Opening and closing CWIP balances for each project in each year.
viii. Annual accumulation of the carrying cost of each project based on progress of construction.
ix. Capital cost transfers from CWIP account to the company's "Fixed Assets" after COD is achieved for each project.
x. CWIP balances up to the end of the "base year" (2023) for each project under construction.

b) For all the Annual Reviews during 2024-2029, JPS shall provide an update to the initial CWIP schedule that is approved within the Business Plan. The update shall include matters specified in (a) (iii, iv, v, vii, viii & ix) above.

9. TREATMENT OF JPS STREETLIGHT ASSETS

9 Background

9.1 In 2016, the GOJ in recognition of problems (including low performance levels/reliability, low efficiency/high energy cost, and significant payment arrears) associated with street lighting services in Jamaica, mandated JPS to commence the implementation of a streetlight programme based on smart LED technology. At a macro level, this measure was considered to be a major aspect of the GOJ's broad energy policy objectives to improve energy efficiency (EE), economic service delivery and environmental sustainability.

JPS Obligation to Implement Smart Streetlight Programme

9.2 For reference, the obligation to implement the streetlight programme mandated by the GOJ is set out in Condition 28, paragraphs 6 to 8 of the 2016 Licence, which provides as follows:

> *"The Licensee shall, by December 30, 2016, commence a programme for the implementation of smart LED lighting technology, that has intelligence capable of remotely reading the consumption of each lamp; provides a unique identifier; allows for the identification' of out-of-service lamps; provides for the dimming of lights when necessary; can accommodate video surveillance and other smart features and is designed in line with international best practices. This programme is hereinafter referred to as the* ***"Smart Streetlight Programme"****. The Office shall utilise a Fund or the System Benefit Fund (as defined in the EA), to allow the Licensee to recover the costs of implementing the Smart Streetlight Programme.*
>
> *In the event the Licensee has not completed the Smart Streetlight Programme by the next rate review or extraordinary rate review following the January 2016 amendment to this Licence, it shall include the Smart Streetlight Programme in its Business Plan to guide the calculation of the Revenue Requirement necessary to allow the Licensee to recover the costs of the Smart Streetlight Programme.*
>
> *The Licensee shall allow the GOJ (the Minister with responsibility of local government, the Minister with responsibility for electricity and the Minister with responsibility for national security) remote access to the information relating to the consumption of each lamp; and information relating to the out-of-service lamps."*

Programme Objective

9.3 As described, the Smart Streetlight Programme (SSP) is being implemented in part fulfilment of the GOJ's overall grid modernization and EE objectives for the electricity sector, as outlined in the National Energy Policy (NEP) framework. This therefore means that the SSP is aimed at achieving the following objectives:

- Significant and sustained improvements in EE in street lighting operations.
- Improvements in overall system operating efficiency.
- Streetlights consumption monitoring and regulation of illumination.
- More affordable and sustainable street lighting services in Jamaica.
- Peak demand shaving and related energy cost savings, and other system benefits.

SSP Scope

9.4 As submitted by JPS, the original scope of the SSP encompassed the replacement of 105,000 existing network-connected streetlight fixtures of mostly high-pressure sodium (HPS) streetlights with smart LED types. Based on JPS's initial SSP implementation plan, the programme was scheduled to be executed in three (3) phases over the period, 2017 - 2020. Phases 1 and 2 have been reported completed, with actual HPS/LED streetlight replacements of 36,440 and 5,358, as at the end of 2017 and 2018, respectively. However, based on SSP updates provided by JPS in 2023, phase 3 (63,202 HPS/LED replacements) is still not fully completed, purportedly due to issues associated with communication network and streetlight smart controllers.

SSP Funding and Asset Cost Treatment

9.5 With respect to SSP funding, Condition 28, paragraph 6 of the Licence provides for the Office to utilize a "Fund" or the System Benefit Fund (as defined in the EA) to cover the costs of the programme. Notwithstanding, due to the fact that the SSP was not completed at time of the 20219-2024 Rate Review, JPS citing the provisions Condition 28, paragraph 7 of the Licence included the remaining portion of the SSP in its 2019-2023 Business Plan, to guide the calculation of the Revenue Requirement necessary to allow the Licensee to recover the costs of the Smart Streetlight Programme.

9.6 After reviewing JPS's SSP proposals, the Office in the 2019-2024 Rate Review Determination Notice determined that all the smart streetlight assets (including those acquired under the SSP prior to the 2019-2024 Rate Review) are to be owned by JPS. Consequently, a total SSP CAPEX of US$23.9M was approved for 2019-2021 (2019 – US$8.25, 2020 – US$8.84, and 2021 – US$6.86) to complete the programme. These capital expenditure was allowed to be captured in JPS's rate base.

Further Streetlight Proposals

9.7 As it relates to any further proposals for the expansion or enhancement of streetlights the following must be observed:

1) The company's streetlight proposals for the 2024-2029 Rate Review period must satisfy the requirements set out in this Criteria and the relevant provisions of the Licence.

2) Proposed CAPEX and OPEX for expanding the smart streetlight deployment during 2024-2029 Rate Review period must be justifiable, and substantiated by supporting data, surveys/assessments, cost benefit analyses, etc.

3) Streetlight assets transferred to JPS from the Government, or any other entities should be detailed in the Rate Review application. Among other things, JPS shall provide the OUR in the Rate Review application the asset transfer agreements, asset valuations/cost, asset status reports, the proposed regulatory treatment and supporting justification.

Technical Evaluation of the Streetlight Proposals

9.8 The OUR's technical evaluation of JPS's streetlight proposals will include:

1) An assessment of JPS's overall performance on the SSP since commencement up to the end of 2023, which will include:
   a) An analysis of the planned scope versus actual achievements
   b) An analysis of the budgeted versus actual expenditures
   c) The energy efficiency effect and demand impact,
   d) The benefits to consumers of the service from the new technology
   e) The Q-Factor implications for the 2024-2029 Rate Review period.

2) An analysis of JPS' 2024-2029 streetlight proposals/programmes to ascertain whether they are reasonable and justified.

Information Requirements for Evaluation of JPS Streetlight Proposals

9.9 To facilitate the technical evaluation of JPS's 2024-2029 streetlight proposals, the following information and details are required and shall be included in the Rate Review Application.

<u>SSP Status</u>

1) A SSP report covering all project activities up to the end of the base year (2023), which should include among other things, the following:
   a) The number of streetlights replacements by parish/service area for each month during the period 2017 June – 2023 December.
   b) Streetlight power rating and luminous intensity equivalence.
   c) A detailed breakdown of the SSP budget and actual expenditure for each year during the period 2017-2023, for each year of the programme.
   d) Specific details on the status of the integration of the SSP intelligence features/capabilities.

2) A schedule of the complete smart LED streetlight inventory up to December 31 of the base year. This schedule shall include the following information for each streetlight:
   a) Parish, Division, JPS pole #, GPS coordinates, etc.
   b) Installation date, year.
   c) Power rating of each installed LED lamp and HPS lamp removed.
   d) Energy consumption measurements obtained from the advanced/intelligent streetlight metering systems.
   e) The avoided energy (kWh) resulting from the streetlight replacements.
   f) The annual demand (MW) impact of the streetlight replacements.

Streetlight Performance Standard (EOS12)

9.10 JPS shall submit the following information:

1) A schedule of JPS's monthly performance in relation to Overall Standard - EOS12 (as defined in Schedule 2 of the Licence) for the period 2019 January – 2023 December, which show the level of compliance against the specified target.

2) The company's projected monthly performance on EOS12 for the 2024-2029 Rate Review period.

Financial Audit of SSP

9.11 JPS shall submit the following information:

- Reports of the company's audits of the SSP expenditure and the balances owing the EEIF as at the end of 2023 December.

Write-off Streetlight Assets

9.12 JPS shall submit the following information:

- In cases where streetlights were replaced as part of the SSP within the 2019-2024 Rate Review period and it has resulted in stranded streetlight assets, which were not considered during the 2019-2024 Rate Review process, the company should include a separate schedule in the 2024-2029 Rate Review covering such assets. This stranded streetlight schedule, should contain among other things, a listing of the affected assets, the in-service/removal date of each stranded asset, and the stranded costs of each of the assets.

Streetlight Assets Transfer to JPS

9.13 JPS shall submit the following information:

- Where streetlights have been transferred to JPS and have recognized as part of JPS's fixed assets up to end of the base year, such streetlight assets shall be clearly identified in the

2023 Fixed Asset Register and 2024-2029 Depreciation Schedule to be submitted by the company as part of the 2024-2029 Rate Review Application.

Criterion 20:

JPS shall adhere to the guidelines and data requirements set out in Section 9 to facilitate the review of the Smart Streetlight Programme and the assessment of proposed streetlight projects for the 2024-2029 Rate Review period.

ANNEXES

ANNEX 1 –Methodology for Computing Controllable OPEX

Year:	Unit	0	1	2	3	4	5	6	7	8	9	10
Green cells are data cells												
Yellow cells are policy decisions												
1. Policy decisions												
Opex starting level	USD	147,736										
Long-term target	%	53%										
Achievement period	years	15										
Cap on annual X	%	3.0%										
2.Resulting efficiency target												
Implied X-factor (computed)	%	4.1%										
X-factor (implicit)	%	3.0%										
3. Efficient opex (exc. demand growth)	USD	147,736	143,304	139,005	134,835	130,790	126,866	123,060	119,368	115,787	112,313	108,944
4. Demand growth projections												
Sales MWh	%		1.91%	2.06%	2.21%	2.14%	2.77%	2.77%	2.77%	2.77%	2.77%	2.77%
Demand MW	%		1.91%	2.06%	2.21%	2.14%	2.77%	2.77%	2.77%	2.77%	2.77%	2.77%
Customer number	%		1.40%	1.40%	1.40%	1.40%	1.40%	1.40%	1.40%	1.40%	1.40%	1.40%
5. Revenue shares												
Sales MWh	%	50%										
Demand MW	%	25%										
Customer number	%	25%										
6. Weighted average demand growth			1.8%	1.9%	2.0%	2.0%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
7. Efficient opex (inc. demand growth)		**147,736**	**145,858**	**144,164**	**142,646**	**141,072**	**140,161**	**139,257**	**138,358**	**137,465**	**136,578**	**135,697**

ANNEX 2: CRITERIA FOR JPS's 2024-2029 Q-FACTOR TARGETS

A2.1 INTRODUCTION

Background

Under the existing legal and regulatory framework for the electricity sector, JPS is designated the Single Buyer/System Operator, who has the obligation to provide adequate, safe, and reliable electricity service to the country, subject to specific quality of service (QoS) standards prescribed in the Licence.

Implicitly, the structure of these QoS standards provide reasonable incentives for JPS to improve overall System reliability, and to ensure that electricity is provided to customers at reasonable rates with acceptable service quality on a sustained basis. While there has been some improvement in reliability performance in certain aspects over time, for the most part, "quality of service" has not been maintained at desirable levels. This is largely due to prevailing network infrastructure and process issues, which have adversely impacted the quality of service delivered to customers across the country.

Recognizing this effect, reliability studies/assessments have been conducted with the aim of improving overall system reliability and service quality. The results of these assessments have been used to develop the regulatory mechanism to incentivize the improvement in quality-of-service performance over the medium to long term. For JPS, the established regulatory mechanism for the treatment of "quality of service" is incorporated in the price control mechanism defined in the Licence, under which, the OUR is required to develop specific criteria for determining annual Q-Factor targets. These targets are required for measuring the company's annual quality of service performance, for application in the established revenue/rate adjustment mechanism.

Against that background, these criteria are deemed important and necessary for establishing the requirements or conditions for "quality of service" assessment and the Q-factor determination in the rate setting process.

Regulatory Context

The Q-Factor, as defined in the Licence, is the allowed price adjustment to reflect changes in the quality of service provided to customers and is one of the key inputs used in the calculation of the annual revenues/rates required for the PBRM (defined in schedule 3 of the Licence).

As stipulated in Schedule 3 of the Licence, which defines the price control mechanism for JPS, the Office shall apply a Q-Factor to JPS non-fuel rates at each PBRM review. To determine the Q-Factor adjustment, the Office is required to measure JPS's "quality of service" performance for each year in the 5-year revenue cap period versus the annual targets set in the 5-year rate review determination. According to the Licence, the annual targets for the Q-Factor shall normally be established by the Office at the Rate Review and broken out year by year.

To effectuate this performance-based rate setting process, the OUR must first establishes the relevant targets for the Q-Factor. In doing so, the OUR pursuant to the provisions of the Licence, is required to establish the criteria for evaluating JPS's Q-Factor proposals and the setting of the relevant annual targets for application during the relevant Rate Review period.

In that context, these criteria are developed to provide specific guidance on the requirements/conditions for the Q-Factor proposals to be included in the 2024-2029 Rate Review Application and for the related regulatory evaluation to be performed by the OUR during the Rate review process, to assure transparency, consistency, predictability, and fairness in the rate setting process. Essentially, these system losses criteria outline the specific technical requirements for developing the annual system losses targets to be included in the 2024-2029 Rate Proposal (Schedule 3, paragraph 11 of the Licence), as required by the Licence.

The Q-Factor Criteria

The applicable criteria are set out in the following sections.

A2.2 QUALITY OF SERVICE DIMENSIONS AND PERFORMANCE METRICS

Dimensions of Quality of Service

Quality of service (QoS) requirements for performance assessment of electric utilities, usually encompass three main dimensions:

- Commercial Quality – involves specific performance measures reflected in Guaranteed/Overall Standards.
- Power Quality – mainly addresses voltage quality of the electricity supply.
- Reliability of Supply – the level of continuity/availability of electricity supply to customers.

Reliability of Supply

For the purpose of the Q-Factor, the applicable dimension is that of "Reliability of Supply", which will be central to these criteria.

System Reliability Measurement

In regulated electric utility operations, where rates are linked to quality-of-service performance, reliability of supply is critical for meeting regulatory targets/objectives and for ensuring acceptable service quality to customers. However, to achieve the reliability objectives, the utility must be able to properly define, measure, manage and monitor the various aspects of system reliability. In measuring system reliability, performance metrics become useful as they provide a framework for quantifying quality of service performance. Additionally, reliability measurements/metrics are also essential for regulatory assessment/monitoring of the utility's reliability performance.

Reliability Performance Metrics

As generally practiced across the electricity supply industry, the measurement/assessment of electricity system reliability ("quality of service") performance, is commonly done using the following metrics/indicators:

1) **System Average Interruption Frequency Index (SAIFI)** - indicates the frequency at which the average customer experiences a sustained interruption (duration > minutes) over a predefined period of time (usually a year).

2) **System Average Interruption Duration Index (SAIDI)** - indicates the total duration of interruption for the average customer during a predefined period of time.

3) **Customer Average Interruption Duration Index (CAIDI)** - represents the average time taken to restore service to the average customer per sustained interruption; and

4) **Momentary Average Interruption Frequency Index (MAIFI)** – indicates the average frequency of momentary interruptions.

In relation to the Q-Factor, as prescribed by the Licence, the applicable metrics are SAIFI, SAIDI, and CAIDI, which will be the foundational basis of these criteria for the Q-Factor targets.

MAIFI Considerations

With respect to MAIFI, while the effects of momentary interruptions on customers' operations can be extreme and severe, it was not included in the Q-Factor adjustment scheme. However, the OUR will continue to assess this metric/indicator and the effects of the related momentary interruptions on electricity service to customers.

A2.3 CRITERIA CONDITIONS

1) This Q-Factor Criteria outlines the key information requirements and procedures that:

    a) should guide the company in developing the Q-Factor proposals for the 2024-2029 Rate Review.
    b) provide the framework for the evaluation and determination of the 2024-2029 Q-Factor baseline and relevant Q-Factor targets for the new price control period.

2) The company shall comply with all the requirements and conditions specified in this Q-Factor Criteria.

3) These criteria should be used in conjunction with other key requirements, particularly, the criteria for JPS's "system reliability improvement plan". This is considered critical for defining/establishing the minimum qualitative and quantitative requirements for setting the Q-Factor targets, prescribed in Schedule 3, paragraph 37 and 39 of the Licence.

4) Before commencing the full Rate Review process, the Q-Factor target proposals and supporting schedules/documents submitted by the company will be thoroughly examined and reviewed to ensure that all the applicable criteria are met.

A2.4 LICENCE REQUIREMENTS FOR Q-FACTOR

Power of OUR to Set Targets (Q-Factor)

Pursuant to Schedule 3, paragraph 37 of the Licence, the Office shall have the power to set targets for losses**,** heat rate and "**quality of service"**, where the targets set should be "reasonable and achievable" taking into consideration the Base Year, historical performance and agreed resources included in the five (5) Year Business Plan, corrected for extraordinary events. The Office shall also take into consideration the role of the GOJ in addressing the non-technical aspect of the system losses that are not entirely within the control of JPS.

Conditions for Q-Factor Targets

As stipulated in Schedule 3, paragraph 39 of the Licence, the target set by the Office for quality of service shall normally be done at the Rate Review for each of the five (5) years and broken out year by year.

Q-Factor Application in the PBRM

According to Schedule 3, paragraph 46 of the Licence, the Office shall apply the Q-Factor to the non-fuel rate at each PBRM.

Further, Paragraph 46(a) of the said Schedule 3, defines the Q-Factor as the annual allowed price adjustment to reflect changes in the quality of service provided by the Licensee (JPS) to its customers. In determining this adjustment factor, the Office shall measure the quality of service versus the annual target set in the 5-year rate review determination, as prescribed by the Licence.

Q-Factor Components

As specified in Schedule 3, Exhibit 1 of Licence, the Q-Factor should be based on three "quality indices", SAIFI, SAIDI and CAIDI, which are defined as follows:

> *"The Q-factor should be based on three quality indices until revised by the Office and agreed between the Office and the Licensee:*
>
> > *SAIFI–this index is designed to give information about the average frequency of sustained interruptions per customer over a predefined area*

$$SAIFI = \frac{Total\ number\ of\ customer\ interruptions}{Total\ number\ of\ customers\ served}$$

(Expressed in number of interruptions (Duration > 5 minutes) per year)

SAIDI–this index is referred to as customer minutes of interruption and is designed to provide information about the average time that customers are interrupted

$$SAIDI = \frac{Customers\ interruption\ durations}{Total\ number\ of\ customers\ served}$$

(Expressed in minutes)

CAIDI–this index represents the average time required to restore service to the average customer per sustained interruption. It is the result of dividing the duration of the average customer's sustained outages (SAIDI) by the frequency of outages for that average customer (SAIFI).

$$CAIDI = \frac{Customer\ interruption\ durations\ or\ SAIDI}{Total\ number\ of\ interruptions\ or\ SAIFI}$$

(Expressed in minutes per interruption (Duration > 5 minutes))

Q-Factor System

The Q-Factor system as designed under Schedule 3, Exhibit 1 of the Licence, is set out below:

"Until revision by the Office the quality-of-service performance should be classified into three categories, with the following point system:

- *Above Average Performance (Greater than 10% below target) — would be worth 3 Quality Points on either SAIFI, SAIDI or CAIDI;*
- *Dead Band Performance (+ or – 10% of target) — would be worth 0 Quality Points on either SAIFI, SAIDI or CAIDI; and*
- *Below Average Performance (Greater than 10% above target) — would be worth -3 Quality.*
  Points on SAIFI, SAIDI or CAIDI.

Until revision by the Office, the adjustment factors that would be assigned to cumulative quality points scores for the three reliability indices as follows: If the sum of the quality points for:

- *SAIFI, SAIDI, and CAIDI is 9, then Q = +0.50%*
- *SAIFI, SAIDI, and CAIDI is 6, then Q = +0.40%*
- *SAIFI, SAIDI, and CAIDI is 3, then Q = +0.25%*
- *SAIFI, SAIDI, and CAIDI is 0, then Q = 0.00%*
- *SAIFI, SAIDI, and CAIDI is -3, then Q = -0.25%*

- *SAIFI, SAIDI, and CAIDI is -6 then Q = -0.40%*
- *SAIFI, SAIDI, and CAIDI is -9 then Q = -0.50%"*

To summarize, based on the design of the Q-Factor scheme, JPS's annual "quality of service" performance measurement in terms of the three (3) quality indices can either be within ±10% of target (dead band) or outside this range (above or below). If the performance on each index falls below 10% of the target; within the dead band; or above 10% of the target, then the quality points awarded would be +3, 0, or -3, for each index respectively. For all three indices, this quality points system results in a total of 27 different scenarios, generating total quality points scores ranging from a minimum of -9 to a maximum of 9, with corresponding Q-Factor ranging between -0.5% and +0.5%.

Embedded Q-Factor Incentive Scheme

1) It is notable that the Q-Factor system as designed comprises an embedded incentive scheme that innately delivers financial rewards or penalties to the company to the extent that there is an over-achievement or under-achievement of the approved Q-Factor, respectively, for a given op. Intuitively, this efficiency adjustment construct also provides a reasonable incentive to the company JPS to improve its fuel conversion efficiency as well as to optimize its overall cost of generation.

2) Intuitively, this construct also provides a reasonable incentive to the company to improve "quality of service" and to establish a pathway for converging to the point of optimal reliability.

Annual Revenue Adjustment

Schedule 3, Exhibit 1 of the Licence also states that the annual PBRM Filing should follow the general framework where the rate of change in the Revenue Cap will be determined through the following formula*:*

dPCI = dI ± Q ± Z, where Q represents the Q-Factor as defined would be an adjustment factor ranging between -0.5% and +0.5%, as represented above.

A2.5 REGULATORY PRINCIPLES FOR Q-FACTOR APPLICATION

For proper application of the Q-Factor, the OUR and JPS have agreed that it should be guided by the following key principles:

1) It should provide proper financial incentives for the company to deliver an acceptable quality of service to customers.
2) The process must be transparent and supported by accurate data/information.
3) It should take into account factors that are outside of the company's control.

Based on the quality-of-service requirements of the Licence, the Q-Factor should be determined based on the average reliability performance across the entire electricity system. This means that all customers served by the system should necessarily receive the same level of service reliability

on a consistent basis, irrespective of their individual preferences. However, indications from historical system reliability data reported by JPS show that this expected uniformity in service reliability is not being achieved. According to the data, this is largely due to significant and sustained disparities in service reliability across the different regions of the network.

A2.6 OUTAGE DATA REQUIREMENTS

Outage Data Quality

To ensure that the determinants for the Q-Factor scheme are reasonable and credible, there must be a high degree of confidence in the quality of the outage data which will be used to derive the relevant "quality indices" required to establish the applicable Q-Factor baseline and relevant targets for the Rate Review period. In that regard, these criteria require the company to demonstrate that the quality of the system outage data used in the relevant reliability calculations to develop the Q-Factor baseline and Q-factor targets for the 2024-2029 Rate Review period, is acceptable and reasonable.

Outage Data Requirements for Q-Factor (2024-2029)

The system outage data requirements relating to the Q-Factor for the 2024-2029 Rate Review process, include:

1) The full Annual Outage Datasets for 2019-2023, which shall include the contents and be structured in the format outlined below and shall be included in the 2024-2029 Rate Review Application.
2) A daily customer count schedule which is described in detail below.

Following the conclusion of the Rate Review process, the company shall submit a monthly Reliability Report to the OUR, which shall include all the data requirements applicable to the Annual Outage Data Report, as well as the status/progress of reliability projects being implemented by the company.

Structure and Contents of the Annual Outage Datasets

This Criteria requires JPS to submit the Annual Outage Datasets (as specified) in its 2024-2029 Rate Review Application, which shall include the contents and be structured as outlined below:

Outage Dataset Structure

1) The Annual Outage Datasets shall be structured in MS Excel Workbook format, with worksheets containing the following elements:
    a. Worksheet (Annex A) - Raw Outage Data
    b. Worksheet (Annex B) - Calibrated Outage Data
    c. Worksheet (Annex C) - Summary of derived reliability performance metrics
    d. Worksheet (Annex D) - 2018-2023 System Reliability Performance Trend
    e. Worksheet (Annex E) – Outage Drivers
    f. Worksheet (Annex F) – Analysis of Non-Reportable Outages
    g. Other Annexes as necessary

Outage Dataset Contents

2) Clear classification and separation of the outages as "Planned" and "Forced" outages. These should be submitted in separate worksheets.
3) Categorization of Planned and Forced outages into JPS Generation, IPPs Generation, Transmission and Distribution related outage events.
4) Categorization of Forced outages into "Sustained" or "Momentary" forced outages, in accordance with the provisions of the Licence, and where necessary, supported by the IEEE Guide for Electric Power Distribution Reliability,
5) Clear identification of outages due to Major System Failures as defined in the Electricity Act, 2015 (the "EA").
6) Clear identification of outages caused by Forced Majeure Events within the definition of the Licence.
7) A unique identification number for each outage event.
8) Clear identification of outages at the distribution level, such as feeder numbers, switch numbers, etc.
9) The specific cause (primary cause and secondary cause as applicable) of each planned and forced outage, such as equipment failure, power supply failure, vegetation, contamination, weather, lightning, wildlife, fire, operator error, public error, and other causes.
10) The geographical location of each Planned and Forced outage.
11) The start and end time, duration of each outage, in minutes,
12) The number of customers affected by each outage.
13) The Daily Total Customer Count.
14) Indications, as applicable, of instances where customer count >= 120% of device capability.
15) Indications of events where the opening of SCADA devices trigger an OMS response (i.e., recording an outage event which physically did not occur). Actions taken to remedy such situations should be described in the outage datasets.

Reliability Indices Calculations in Outage Datasets

1) For the SAIFI, SAIDI and MAIFI values (daily, monthly, and annual) and other derived indicators (e.g., Customers Interrupted (CI) and Customer Minutes of Interruption (CMI) reported in the outage datasets), the company shall clearly show all the mathematical formulas and calculations used to derive these indicators.

The reliability indices computations shall be in accordance with the requirements of the Licence, and where necessary, supported by the IEEE Guide for Electric Power Distribution Reliability.

Outage Data Quality

To ensure that the determinants for the Q-Factor scheme are reasonable and credible, there must be a high degree of confidence in the quality of the outage data which will be used to derive the relevant "quality indices", required to establish the applicable Q-Factor baseline and relevant targets for the Rate Review period. In that regard, these criteria require the company to demonstrate

that the quality of the system outage data used in the relevant reliability calculations to develop the Q-Factor baseline and Q-factor targets for the 2024-2029 Rate Review period, is acceptable and reasonable.

Outage Data Improvement Strategy

Over the past two (2) Rate Review cycles, JPS has made significant progress in addressing its outage data quality issues. This includes the implementation of advanced Outage Management Systems (OMS) integrated with other utility information/management system platforms, to enable the company to accurately collect and report system outage data. Of note, the most recent development involves the deployment of the new OSI OMS (commissioned into service in 2022 March), to enhance the company's operational capabilities in relation to reliability measurements, performance tracking and reporting.

Notwithstanding, there are lingering, and unresolved issues associated with the OMS operation and the overall outage data collection process, which could have implications for the Q-Factor during the 2024-2029 Rate review period.

In light of these concerns, this Criteria requires the company to appropriately address the aforementioned issues so as to prevent any compromise of the quality of the outage data required for system reliability assessment and Q-Factor determination at the 2024-2029 Rate Review and related Annual Reviews during the 5-year price control period.

Accordingly, the company is required to provide the following information and details in the 2024-2029 Rate Review Application:

1) Evidence indicating that all outstanding OMS data issues have been corrected.
2) Evidence indicating that problems relating to the integration of the OMS with GIS, CIS and other information/management systems have been fully resolved.
3) Report on the review and update of the existing "Rule Based Management" approach triggered by the implementation of the new OSI OMS, including the "*Rules Base Data Dictionary*", used to normalize outage data.
4) Report addressing JPS designated "Non-Reportable" outages, including among other things, the scope and number of these outages, reason for classification, and the company's strategy to limit and eliminate the need for such exclusion.

A2.7 JPS Q-FACTOR TARGETS PROPOSALS

The company's Q-Factor proposals for the 2024-2029 Rate Review period must satisfy the requirements set out in this Criteria.

Conditions for Q-Factor Baseline and 5-Year Annual Targets

1) A new Q-Factor baseline should be established, which will be the reference level for the 2024-2029 system reliability performance forecast and for the setting the annual Q-Factor targets to be applied in the PBRM during the review period.

2) The proposed Q-Factor targets shall cover the 5 years in the 2024 – 2029 Rate Review period. For the avoidance of doubt, the proposed annual Q-Factor targets (SAIFI, SAIDI and CAIDI) shall be for the years:
    i. Targets for 2024 - to be applied at the 2025-2026 Annual Review,
    ii. Targets for 2025 - to be applied at the 2026-2027 Annual Review
    iii. Targets for 2026 - to be applied at the 2027-2028 Annual Review
    iv. Targets for 2027 - to be applied at the 2028-2029 Annual Review
    v. Targets for 2028 - to be applied at the 2029-2034 Rate Review

3) At a minimum, the scope of the proposed targets must be consistent with the system reliability improvement expected over the 2024-2029 review period.

4) The proposed Q-Factor targets must meet all the relevant requirements (qualitative/quantitative) outlined in this Criteria. It should be noted that the target proposals will be fully assessed to ascertain that all Criteria requirements are satisfied.

5) The proposed Q-Factor targets shall be in accordance with the "reasonable and achievable" condition, and other relevant requirements specified in the Licence. The targets should also be in alignment with the long-term goal of achieving the optimal reliability level in the electricity system.

NOTE: Specific information requirements and details relating to system reliability that are considered necessary for the regulatory and technical evaluation of the Q-Factor proposals are outlined in subsequent sections of this Criteria.

Q-Factor Targets Proposals – Requirements and Contents

To facilitate the OUR's review of JPS's proposed Q-Factor targets for the 2024 - 2029 Rate Review period, as required by the Licence, the target proposals included in the Rate Review Application, shall satisfy the following requirements:

1) The 2024-2029 Q-Factor target proposals shall cover all the requirements and conditions for "quality of service" and the Q-Factor, defined in Schedule 3, paragraph 39 and Exhibit 1 of the Licence.

2) Specifically, the Q-Factor proposals shall include JPS's proposed Q-Factor Baseline, annual quality of service performance forecast, and the proposed annual Q-Factor targets for each of the 5 years in the subject Rate Review period and shall outline the methodology used to develop the proposed targets.

3) The Q-Factor targets proposals shall be fully justified and substantiated with the relevant supporting schedules/data (annual outage datasets, etc.), calculations, documentation, and software simulation files where applicable.

4) Strategically, the 2024-2029 Q-Factor targets proposals should elaborate the scope, objectives, and strategy for improving overall system reliability to acceptable levels over the 5-year Rate Review period, and the strategy for achieving optimum reliability level in the system in the long term.

System Reliability Improvement Strategy

The company's system reliability improvement strategy to be presented in the 2024-2029 Rate Review Application should incorporate, among other things, the following requirements:

1) The overall system reliability improvement programme/projects supporting the 2024-2029 Q-Factor targets, should be practical and credible. The company shall also provide justification for each reliability project/initiative, which should be substantiated by, among other things, the respective feasibility studies, cost benefit analyses, and software simulation files.

2) All proposed 2024-2029 capital projects for system reliability improvement included in JPS's 2024-2029 Rate Review Application shall conform with the Capital Projects' requirements set out in this Criteria.

3) The company shall provide a detailed description of its proposed 2024-2029 system reliability improvement programme/projects (to address SAIFI and SAIDI), to include project costs, expected loss reduction impact, start date, duration, etc.

4) The proposed system reliability improvement measures/initiatives should be in line with the forward-looking goal of achieving the optimum reliability level in the electricity system.

5) During the review period, the company shall submit to the OUR quarterly progress reports on the implementation status of the approved 2024-2029 system reliability improvement projects.

A2.8 OUR's EVALUATION OF JPS' Q-FACTOR TARGETS PROPOSALS

Scope and Objective

The scope and objective of the OUR's evaluation of JPS's Q-Factor proposals included in the 2024-2029 Rate Review Application, will encompass the following:

3) Initial regulatory review of JPS's 2024-2029 Q-Factor proposals and supporting schedules within the allowed 10-working day period after the date of submission of the 2024-2029 Rate Review Application (Schedule 3, paragraph 7 of the Licence), for adequacy and completeness, and to ascertain whether they meet the requirements of the Criteria and Licence, so as to determine overall acceptability of the Rate Application.

4) Upon acceptance of JPS's 2024-2029 Rate Review Application by the Office, the OUR will embark on a comprehensive technical evaluation of the 2024-2029 Q-Factor proposals in accordance with the legal and regulatory requirements to:

   a. validate whether JPS's proposed Q-Factor baseline, annual reliability performance forecast, and the proposed annual Q-Factor targets, meet the "reasonable and achievable" condition, and are consistent with the configuration/topology and operating capability of the electricity system, assumed by the company for the subject review period.

   b. assess JPS's overall system reliability performance during the 2019-2024 review period, which will focus on reported annual outages (number, causes, frequency and duration, quality indices, etc.), the status and impact of the 2019-2024 reliability projects, and the resulting effects on customers. The findings emanating from this review will inform the OUR's determinations on the Q-Factor for the 2024-2029 Rate Review period.

   c. evaluate/analyze the selected Annual Outage Datasets (2019-2023) to establish the Q-Factor baseline for the 2024-2029 Rate Review period.

   d. Evaluate/analyze JPS's 2024-2029 Q-Factor proposals and related reliability improvement plan to support the setting of the annual targets, as required by the Licence.

Q-Factor Evaluation Approach

1) The OUR's assessment of JPS's Q-Factor proposals included in the 2024-2029 Rate Review Application, will be based on detailed "technical-economic" and statistical evaluation/analyses, in order to determine Q-Factor targets for the company that are reasonable and representative, and consistent with the configuration and capability of the electricity system.

2) The OUR's technical evaluation of the Q-Factor proposals will be carried out using the outage datasets, reliability performance indicators, study reports and schedules provided by JPS, and other available system reliability data, and with the application of established methods, models, and tools.

Information Requirements for Q-Factor Evaluation

To facilitate the technical evaluation of JPS's 2024-2029 Q-Factor proposals, the following information and details are required and shall be included in the Rate Review Application:

Network Mapping and Data Coverage

a. A detailed schedule (in MS Excel) showing the data and linkages for the following constructs:
   i. "Customer-to-Feeder" mapping
   ii. "Transformer-to-Feeder" mapping
   iii. "Customer-to-Transformer" mapping

b. Specific details on the integration of the OMS, GIS, CIS, and other relevant information/management platforms, set up to improve outage data quality and the accuracy of the reliability indicators derived from such data.

Annual Outage Datasets

a. The Annual Outage Datasets for 2019-2023, which shall include the contents and be structured in the format specified in this Criteria.
b. For each of the named Annual Outage Datasets, the company shall sufficiently describe and clearly show all modifications made to the "Raw Outage Data" to produce the "Calibrated Dataset".
c. The datasets shall also include the calculations and formulas used to derive the prescribed quality indices (SAIFI, SAIDI and CAIDI).

Customer Count Data

a. A detailed schedule of the number of customers registered in JPS's CIS at the end of each day for each year in the period 2019-2023.
b. The daily customer count schedule shall clearly indicate the status of each account, that is, "Active", "Inactive" or other status (with definition).

Outage Cause Analysis

a. A detailed "Outage Cause Analysis" report covering each year in the 2019-2024 review period. This report should address, among other things, the issue of the significant number of forced outages occurring with causes defined by JPS as "Unknown".
b. An Outage Cause Analysis report will also be required at each Annual Review during the 2024-2029 Rate Review period.

System Reliability Studies/Assessments

a. The company shall provide the full reports/results, network models, inputs/assumptions, and software simulation files for system reliability studies/assessments (Probabilistic Reliability Assessment, Contingency Analysis, etc., using DigSILENT PowerFactory software or equivalent, and statistical software tools), executed based on the existing and projected power system configuration, to rationalize its projected reliability performance for the proposed 2024-2029 Q-Factor targets.
b. Assumptions and results of the "Integrated Resource Plan" (IRP) applicable to the proposed system reliability programme.

c. Update for JPS Cost of Unserved Energy (COUE) Study dated 2019 January 31.

Methodology for developing the Q-Factor Targets

a. A detailed description of the methodology/models employed by the company to develop the system reliability performance forecast and annual Q-Factor targets for the 2024-2029 Rate Review period.

System Reliability Improvement Projections

a. The estimated improvements in system reliability (in terms of outage frequency and duration) to be achieved from the proposed reliability improvement projects/initiatives to be implemented during the 2024-2029 Rate Review period.

Worst Performing Feeders

a. A list of the ten (10) worst performing feeders, including relevant reliability statistics for each of these feeders (e.g., the number of forced outages, SAIDI, SAIFI, MAIFI, etc.), for the past ten (10) years, with and without major events, and the proposed reliability improvement initiatives (to include scope and cost) for these low reliability feeders.
b. This reliability performance data is required even if there is no proposed capital expenditure for these feeders for the 2024-2029 review period.

Reliability Metrics Computations

The reliability metrics computations including the following:

a. The overall average daily, monthly, and annual SAIFI, SAIDI, CAIDI and MAIFI, based on the forced outages reported in the respective Annual Outage Datasets (IPPs forced outages excluded).
b. The annual average SAIFI and SAIDI values for the different system segments, generation (IPPs contribution excluded), transmission and distribution.
c. The annual average SAIFI and SAIDI values, broken out by Parish/Service Area.
d. Customer Interrupted (CI) and Customer Minutes of Interruption (CMI); and
e. The Major Event Day (MED) Threshold (T_{MED}) for reference and comparative analysis, but not for Q-Factor application.

System Reliability Studies/Assessments

a. The company shall provide the full reports/results, network models, inputs/assumptions, and software simulation files for system reliability studies/assessments (Probabilistic Reliability Assessment, Contingency Analysis, etc., using DigSILENT PowerFactory software or equivalent, and statistical software tools), executed based on the existing and projected power system configuration, to rationalize its projected reliability performance for and proposed Q-Factor targets, for the 2024-2029 Rate Review period.

b. Update for JPS Cost of Unserved Energy (COUE) Study dated 2019 January 31

Methodology for developing the Q-Factor Targets

a. A detailed description of the methodology/models employed by the company to develop the system reliability performance forecast and annual Q-Factor targets for the 2024-2029 Rate Review period.

T&D Maintenance Plan

a. JPS annual T&D maintenance plan for 2024-2029 period.

b. Records of JPS T&D maintenance programme and activities executed during the 2019-2024 review period.

JPS 2019-2024 Reliability Projects

a. A detailed report on status of the reliability projects (TLs and NTLs) approved for implementation during the 2019-2024 Rate Review period, covering the scope, costs, benefits, and the resulting loss reduction impact, in each case.

NOTE: All the required information shall be included in the 2024-2029 Rate Review Application.

Q-Factor Evaluation – Results and Findings

The results and findings of the OUR's Q-Factor evaluation will be factored in the determination of the 2024-2029 Q-Factor targets. The results, findings and comments emanating from the evaluation will be clearly set out in the tariff determination document.

A2.9 OUR's DETERMINATION ON JPS Q-FACTOR PROPOSAL (2024-2029)

1) After completing its evaluation/analysis of JPS's 2024-2029 Q-Factor proposals and supporting data, the OUR will determine, among other things, the Q-Factor baseline, annual Q-Factor targets, and the "quality of service" adjustment mechanism, to be applied in the PBRM during the 2024-2029 Rate Review period. In making its determination, the OUR will take into consideration, among other things, following:

    a) The relevant provisions of the Licence;
    b) The results/findings of the OUR's 2024-2029 Q-Factor evaluation;
    c) The existing & future configuration/topology of the T&D network;
    d) The degree of coordination/integration of JPS's data collection and information systems (OMS, SCADA, GIS, CIS, IVR, ADAMS, AMI, and others); and
    e) Benchmarks indicators for electricity system reliability indices.

2) The OUR's determination will address, among other things, the following aspects:
    a. System outage data quality and the reliability of the OMS and supporting facilities
    b. Exclusions from reliability calculations
    c. The efficacy of JPS's ongoing system reliability programme.
    d. The trends in JPS quality of service performance (SAIFI and SAIDI).

e. The mechanics of the Q-Factor incentive scheme.
f. Momentary interruption events and the MAIFI indicator.
g. Treatment of power (voltage) quality related issues.

ANNEX 3 – CRITERIA FOR JPS SYSTEM LOSSES TARGETS - 2024-2029 RATE REVIEW

ABBREVIATIONS AND DEFINITIONS

AMI	Automated Metering Infrastructure
ART	Annual Revenue target
C&I	Commercial and Industrial
CIS	Customer Information System
CT	Current Transformer
DG	Distributed Generation
ELS	Energy Loss Spectrum
GHG	Green-house Gas
GIS	Geographic Information System
GNTL	NTLs not totally within JPS' control
GOJ	Government of Jamaica
KWh	Kilowatt hour
JNTL	NTLs directly within JPS' control
JPS	Jamaica Public Service Company Limited
LF	Load Factor
LLF	Load Loss Factor
MWh	Megawatt hour
NTLs	Non-Technical Losses
OUR	Office of Utilities Regulation
PBRM	Performance Based Rate-Making Mechanism
PT	Potential Transformer
RF	Responsibility Factor
RS	Revenue Surcharge
T&D	Transmission and Distribution
TLs	Technical Losses
UF	Utilization Factor

A3.1 INTRODUCTION

Over the years, excessively high electricity losses (aggregate technical & commercial) have been a major challenge for Jamaica's electricity sector, imposing significant economic burden on ratepayers, and resulting in financial penalties to the utility company (JPS). Recognizing this effect, studies/assessments have been carried out to identify the various loss drivers, quantify the losses, and to determine the impact on the utility operations. From the results and evidence obtained, regulatory mechanisms/incentives have been formulated to encourage improvements in operational efficiency through reductions in electricity losses, over the medium to long term. For JPS, the established regulatory methodology for the treatment of system losses is incorporated in the price control mechanism, defined in the Licence under which the OUR is required to develop specific criteria for determining annual system losses targets for the company, for efficiency adjustment in the established revenue/rate adjustment mechanism.

Regulatory Context

Under the existing price control regime for JPS, the Y-Factor (actual system losses versus targets) is one of the main inputs used in the calculation of the annual revenues/rates required for the PBRM (defined in schedule 3 of the Licence).

As stipulated in Schedule 3, of the Licence, which defines the price control mechanism for JPS, the Office shall apply a Y-Factor to JPS non-fuel rates at each PBRM review. To satisfy this requirement, the Office is required to measure JPS's actual system losses for each year in the 5-year revenue cap period versus the annual targets set in the 5-year rate review determination. According to the Licence, the annual targets for system losses shall normally be established by the Office at the Rate Review and broken out year by year.

To effectuate this rate setting process, the OUR must first establishes the relevant system losses to be applied in the PBRM. In doing so, the OUR, pursuant to the provisions of the Licence, is required to establish the criteria for evaluating JPS's Q-Factor proposals and the setting of the relevant annual targets for application during the relevant Rate Review period.

In that context, these criteria are developed to provide specific guidance on the requirements/conditions for the system losses proposals/targets to be included in the 2024-2029 Rate Review Application and for the related regulatory evaluation to be performed by the OUR during the Rate review process, to assure transparency, consistency, predictability, and fairness in the rate setting process. Essentially, these system losses criteria outline the specific technical requirements for developing the annual system losses targets to be included in the 2024-2029 Rate Proposal (Schedule 3, paragraph 11 of the Licence), as required by the Licence, and the regulatory approach for setting the relevant targets, as required by the Licence.

The System Losses Criteria

The applicable system losses criteria are set out in the following sections.

A3.2 DEFINITION - SYSTEM LOSSES

Energy losses in electric utility systems is a key indicator of the efficiency and financial sustainability of the power sector and reflects the degree of productivity of the Transmission and Distribution (T&D) System. By definition, it generally represents the difference between the amount of energy (MWh) injected into the network and the energy delivered and billed to the customers over a specified period of operation. The system losses recorded are commonly represented on a percentage basis (i.e., actual energy losses expressed as a percentage of total energy input [total net generation]), as shown in the equation below:

System Losses (%) = [(Energy Input – Energy Billed) x100]/Energy Input

The losses tend to occur at all levels of the network, from transmission to distribution down to the supply segment (inclusive of metering) and are caused by both technical and non-technical factors, hence the losses can be separated into two (2) main categories (technical and non-technical losses).

Technical Losses

The technical losses (TLs) are inherent in electricity system operations, primarily due to power dissipation in electrical equipment/components used in the transmission, distribution and supply of electricity. These losses can also be disaggregated into fixed and variable losses.

Fixed TLs

Fixed TLs are caused by physical inefficiencies such as hysteresis, eddy currents losses in the iron core of transformers, and the corona effect in transmission lines. These losses are proportional to the square of the voltage and are independent of power flow and can account for between 20 and 40 percent of total TLs.

Variable TLs

Variable TLs occur when current flows through the lines, cables, and transformers in the electricity network, causing power loss. These losses are also called load losses, series losses, copper losses, or transport-related losses, and are proportional to the resistance of the branch and to the square of the current in the branch (power loss = I^2R loss). Depending on the configuration of the electricity network, this category of TLs can be significant and therefore should be a major consideration in the engineering/technical design and operation of the electricity system, and the TL reduction strategy. Due to the nature of TLs, they can be reasonably measured and reduced to optimum level, subject to optimal transmission and distribution (T&D) network design configuration and economic operation.

Non-Technical Losses

NTLs are caused by non-technical or commercial factors (conditions external to the power system), namely, electricity theft, defective/inaccurate metering devices, metering/billing errors, estimated bills, lack of proper energy accounting, etc., and are therefore associated with the commercial management of the electric utility companies. Based on these causation factors, NTLs are usually more difficult to measure and are often not accurately accounted for by the electric utilities.

It should be noted that sustained high levels of NTLs have several perverse effects. A clear manifestation of the effects of this problem, is when legitimate/paying customers are required to subsidize the cost of users who contribute to NTLs. Also, it creates risks for the financial sustainability of the electric utilities, increased electricity tariffs for regular customers, and more green-house gas (GHG) emissions.
Given these issues, it is critical for the utility to have proper energy accounting systems in place together with a robust loss reduction strategy, to address NTLs, so as to reduce the cost burden on ratepayers and to assure the financial viability of the utility.

A3.3 CRITERIA CONDITIONS

1) This system losses Criteria defines the key information requirements and procedures that:
   a. should guide the company in developing the system losses proposals for the 2024-2029 Rate Review.
   b. provide the framework for the evaluation and determination of the relevant system losses targets for the new price control period.

2) The company is required to comply with all the requirements and conditions specified in this system losses criteria.

3) These criteria should be used in conjunction with other key requirements, in particular, the criteria for JPS's "system loss mitigation activities and related funding requirements". This is considered critical for defining/establishing the minimum qualitative and quantitative requirements for setting the system losses targets, prescribed in Schedule 3, paragraphs 37 and 38 of the Licence.

4) Before commencing the full Rate Review process, the target proposals and supporting schedules/documents submitted by the company will be thoroughly examined and reviewed to ensure that all the applicable criteria are met.

A3.4 LICENCE REQUIREMENTS FOR SYSTEM LOSSES TARGETS

Power of OUR to Set Targets (System Losses)

Pursuant to Schedule 3, paragraph 37 of the Licence, the Office shall have the power to set targets for "**losses",** heat rate and quality of service, where the targets set should be "reasonable and achievable" taking into consideration the Base Year, historical performance and agreed resources included in the five (5) Year Business Plan, corrected for extraordinary events. The Office shall also take into consideration the role of the GOJ in addressing the non-technical aspect of the system losses that are not entirely within the control of JPS.

Aspects of System Losses Targets

Specifically, with respect to the setting of systems losses targets for JPS, Schedule 3, paragraph 38 of the Licence, provides as follows:

> *"The target set by the Office for losses shall normally be done at the Rate Review and be for a "rolling"[1] ten (10) year period and broken out year by year over the following three (3) categories:*
>
> *a. Technical losses;*
> *b. The aspect of non-technical losses that are within the control of the Licensee; and*
> *c. The aspect of the non-technical losses that are not totally within the control of the Licensee."*

As cited in the Licence, the rolling nature in respect of the losses targets, assures a clear long-term focus for loss mitigation, incentivizing JPS to go beyond what might have been agreed in the five (5) year Business Plan, because the benefit will be accrued over a longer period. The Licence also notes that the breakdown of the individual elements of the loss targets will assure a linkage to the reductions targeted and the actions taken and/or funded in the five (5) year Business Plan. According to the Licence, it also supports a potential "Z-Factor" adjustment in case the NTLs that are not totally within JPS's control are strongly influenced by matters unforeseen during the rate review process.

Y-Factor and True-up Losses Mechanism

According to Schedule 3, paragraph 46(c) of the Licence, the "Y-Factor" reflects the achieved results versus the long-term overall system losses target. That is, the measurement of the actual annual losses against the established targets.

As set out under Schedule 3, Exhibit 1 of the Licence, the computation of the Y-Factor and "True-up Loss" (TULos) required for determining the Revenue applicable Surcharge (RS) and the Annual Revenue Target "ART" adjustment, shall be based on mechanism outlined below:

$TULos_{y-1} = Y_{y-1} * ART_{y-1}$

$Y_{y-1} = Ya_{y-1} + Yb_{y-1} + Yc_{y-1}$

Ya_{y-1} = Target System Loss "a" $Rate\%_{y-1}$ – Actual System Loss "a" $Rate\%_{y-1}$

Yb_{y-1} = Target System Loss "b" $Rate\%_{y-1}$ – Actual System Loss "b" $Rate\%_{y-1}$

Yc_{y-1} = Target System Loss "c" $Rate\%_{y-1}$ – Actual System Loss "c" $Rate\%_{y-1}$ * RF

where:

Ya = System losses that fall under subsection "a" of paragraph 38.

Yb = System losses that fall under subsection "b" of paragraph 38.

Yc = System Losses that fall under subsection "c" of paragraph 38.

A3.5 CRITERIA SCOPE AND FOCUS AREAS

1) **System Losses Measurement /Calculation**
    a. Methodologies for measuring TLs and NTLs.
    b. Energy Losses Spectrum (ELS).
    c. Energy balance in different network segments.
    d. Disaggregation of total system losses in lowest sub-components.
    e. System Loss calculation methodology – sales figures used (billed vs total sales).
    f. Energy Balance in the different network segments.
    g. Energy recorded at metering points – generation interconnection meters, HV substations meters, feeder meters, distribution transformer meters, check meters, and customer revenue meters.
    h. Accounting for substation energy usage.

2) **System Losses Data Requirements**
    a. System losses causation factors.
    b. Customer-to-transformer mapping and customer-to-feeder mapping
    c. Scale of network visibility – network intelligence, communication systems, DMS, etc.

d. Energy accounting data, account audit findings/results, reports from analytics.
e. Internal Controls – metering/billing errors, reconciliation process for recovered energy.
f. Scale of network visibility – network intelligence, communication systems, DMS, etc.
g. Number of advanced revenue meters, total meters, transformer meters, and other smart devices installed.
h. RAMI systems data.

3) Guidance of System Losses Targets Proposal Submission

4) Information Requirements for Evaluation of System Losses Target Proposals

5) Regulatory Treatment of NTLs

6) Approach for Allocating NTLs to JNTL and GNTL

- JNTL - refers to the aspect of NTLs that are within the control of JPS
- GNTL - refers to the aspect of NTLs that are not totally within the control of JPS

7) Conditions and factors for determining the system losses targets

8) Requirements for Responsibility Factor (RF)

A3.6 MEASUREMENT AND QUANTIFICATION OF SYSTEM LOSSES

a) The scope of the energy losses measurement must account for 100% of the system-wide losses (all TLs and NTLs).

b) The criteria require the company to appropriately measure and account for all relevant categories of TLs and NTLs contributing to total system losses, within the boundary of the different system segments as set out in the Electricity Sector Codes, over the 5-year Rate Review period.

c) The company shall provide adequate details on the specific causes/sources, and distribution of each category of TLs and NTLs.

d) The company shall report all energy losses using a consistent approach that will align the base year loss level with the system losses performance for subsequent years in the 5-year Rate Review period.

e) The loss reduction strategy should include a credible mechanism to track system losses performance against targets.

Energy Loss Spectrum

- The Energy Loss Spectrum (ELS) by definition is a structured model used for reporting and accounting for energy losses occurring in the electricity system, with some limitations. Based on

application overtime, it has proven to be a pivotal input in the over-arching strategy contemplated to measure, manage, mitigate, and monitor overall system losses.

- Essentially, the ELS framework encompasses a practicable methodology used for the categorization and quantification of system losses over a specified time period (normally a month or a year), with the losses calculated on a 12-month rolling average basis, using specific system performance data/measurements.

- As structured, the ELS model provides a detailed breakdown of the global losses into major categories and sub-categories, informed by data covering the sources and factors driving the losses in each segment of the electricity network.

Structure and Composition of the ELS to be submitted to OUR

This Criteria requires JPS to submit the ELS (as specified) to the OUR at the 2024-2029 Rate Review, the related Annual Reviews, and for monthly regulatory reporting, which shall include the contents and be structured as outlined below:

a. The total energy losses (including all constituents) reported in the ELS shall be calculated on a 12-month rolling average basis, expressed in both percentage (% of total net generation) and absolute (kWh or MWh) terms.
b. The ELS model/report shall be developed and submitted in MS Excel format.
c. The ELS shall clearly show the "Energy Balance" (represented in kWh or MWh), accurately reflecting the total system net generation, billed electricity sales and total electricity losses, for the base year, other applicable years, and the applicable months.
d. For the monthly system losses reporting, the discrete energy losses level (actual) for the applicable billing month must be reflected in the 12-month rolling average calculation.
e. The TLs component shall be appropriately represented and fully disaggregated into: Transmission Network TLs, Primary Distribution Line TLs, Distribution Transformer TLs, and Secondary Distribution Network TLs, with the quantity measured for each respective category reported on a percentage (%) and absolute (kWh or MWh) basis.
f. The NTLs shall be broken down into the main categories: Billed Customers, the "Illegal Users" and JPS Internal losses categories and shall indicate the total number customers in each rate class, bill sales (kWh or MWh), and other relevant information.
    i. NTLs attributable to Billed Customers (metered service), shall be disaggregated into: Streetlight/Stoplight (RT60), Wholesale class (R70), Large C&I (RT50), Large C&I (RT40), Medium C&I (RT20), Small C&I (RT20), and Residential (RT10) sub-categories.
    ii. For NTLs defined as "Internal", JPS shall provide a detailed description of the approach used to estimate this element of the losses.
    iii. For NTLs estimated for the "Illegal Users" category, JPS shall provide a detailed description of the methodology used to estimate these losses, including the basis for assumed number of "illegal users".
g. Allocations for JNTL and GNTL shall NOT be included in the ELS.
h. Energy billed to customers but not paid for shall not be counted and reported as system losses.
i. Recoverable (reclaimed) energy (kWh adjustments) resulting from the detection and elimination of losses/leakages (defective/inaccurate metering device, billing errors, theft, etc.), previously reported as losses, shall be excluded from the total system losses after the amount of recoverable

energy is quantified, and shall be noted and shown to be excluded from the reported total system losses.

Modification to ELS

- JPS shall NOT materially modify any aspect of the ELS (historical and forecast) without the approval of the OUR.

System Losses Reporting

a) The company shall report the monthly/annual system losses in the ELS model as described, in accordance with the requirements of the Licence, and the established regulatory reporting framework, on an ongoing basis.

b) Prior to the submission of the 2024-2029 Rate Review Application, JPS shall submit the ELS capturing the system losses or the operating period 2023 January 1 - December 31, which shall reflect all the contents and the format defined in these criteria, for regulatory assessment.

Requirements for Application of the ELS

a) The Criteria require that system losses reported in the ELS for the period January 1 to December 31 of the base year (as defined in the Licence) will form the baseline for estimating JPS's 2024-2029 system losses performance levels, and for deriving the relevant annual targets required for "Y-Factor" and annual Revenue Surcharge (RS) computations during the 2024-2029 Rate Review period.

b) At each "Annual Review" during the 2024-2029 Rate Review period, the ELS covering the period January 1 to December 31 of the preceding calendar year, will be applied for the purpose of validating JPS's actual annual system losses performance, to be measured against the relevant annual targets (pre-established) for the computation of the applicable Y-Factor.

c) For the duration of the 2024-2029 Rate Review period, JPS shall in accordance with the established regulatory reporting framework, prepare and submit the ELS for each applicable billing month to the OUR, to facilitate regulatory monitoring and the tracking of the company's system losses performance relative to established targets over the stated period.

For the ELS to be submitted for the base year, the company shall provide a detailed description of the methodology used to measure/estimate each component of the TLs and NTLs.

A3.7 JPS SYSTEM LOSSES TARGETS PROPOSAL

The company's system losses proposals for the 2024-2029 Rate Review period must satisfy the requirements set out in this Criteria.

JPS's system losses targets proposals for the (2024-2029) Rate Review period should define the scope and objectives for energy loss reduction over the 5-year period, and the ambition to achieve economically efficient loss levels over the long-term.

Conditions for Base Year System Losses and 5-Year Annual Targets

1) The reported system losses level for the base year (2023 calendar year) will be the reference point for the 2024-2029 system losses forecast and corresponding annual targets, and the loss reduction trajectory for the 2024-2029 Rate Review period.

2) The proposed annual system losses targets (TLs, JNTLs, GNTLs and RF), in the first instant, shall cover the full 5 years in the 2024 – 2029 Rate Review period. That is, the proposed annual targets shall be represented as follows:
   i. Targets for 2024 - to be applied at the 2025 Annual Review,
   ii. Targets for 2025 - to be applied at the 2026 Annual Review
   iii. Targets for 2026 – to be applied at the 2027 Annual Review
   iv. Targets for 2027 - to be applied at the 2028 Annual Review
   v. Targets for 2028 - to be applied at the 2029-2034 Rate Review

3) At a minimum, the scope of the proposed system losses targets must be relative to the level of annual energy loss reduction expected over the 2024-2029 review period.

4) To satisfy the "rolling" ten (10) year target requirement stipulated in Schedule 3, paragraph 38 of the Licence, the company should also propose system losses targets for the following 5-year period (2029 - 2034).

5) The system losses target proposals must meet all the relevant qualitative/quantitative requirements outlined in this Criteria. It should be noted that the target proposals will be fully assessed to ascertain that all Criteria requirements are satisfied.

6) The proposed system losses targets shall be in accordance with the "reasonable and achievable" condition, and other relevant requirements specified in the Licence. The targets should also be in alignment with the long-term loss reduction objective for the electricity system and energy efficiency (EE) goals of the sector.

System Losses Targets Proposals – Requirements and Contents

To facilitate the review of JPS's proposed system losses targets for the 2024 - 2029 Rate Review period, as required by the Licence, the target proposals included in the Rate Review Application shall satisfy the following requirements:

1) The 2024-2029 system losses target proposals shall cover all the requirements and conditions involving the scope and categories of system losses defined in Schedule 3, paragraph 39 and Exhibit 1 of the Licence.

2) Specifically, the system losses proposals shall include JPS's 2024-2029 annual system losses performance forecast (TLs, JNTL and GNTL), the corresponding annual targets, and the responsibility factors (RFs) applicable to GNTL, to be applied in the PBRM over the 5-year price

control period. The proposals shall also outline the methodologies employed to develop the relevant system losses targets.

3) The proposed system losses targets shall be fully justified and substantiated with the relevant supporting schedules/data, calculations, documentation, and software simulation files where applicable.

4) Strategically, the 2024-2029 system losses target proposals should define the scope, objectives and strategy for energy loss reduction for the 5-year review period, and the ambition to achieve economically efficient loss levels over the long-term.

5) To satisfy the "rolling" ten (10) year target requirement stipulated in Schedule 3, paragraph 38 of the Licence, the Rate Review Application shall also include system losses performance forecast and proposed annual targets for the 5-year period (2029 - 2034).

6) The proposed annual targets (TL, JNTL and GNTL) for 2024-2029, shall be justified by the company and substantiated with the relevant supporting schedules, documentation, calculations, 2023 ELS, 2024-2029 loss reduction plan/projects, and other relevant data.

7) For the TLs performance forecast and targets proposed for each year in the review period, the company shall provide a breakdown clearly showing the allotment for the transmission network, primary distribution lines, distribution transformers and secondary distribution network, in each case.

8) With respect to the NTLs performance forecast and targets proposed for each in the review period, the company shall provide a breakdown clearly showing the allotment for the Billed Customers (RT10, RT20, RT40, 50 & 70, and RT60), Illegal Users and Internal Losses categories, in each case.

9) With respect JNTL and GNTL, the proposed targets for 2024-2029 shall be substantiated by reasonable and justifiable distribution factors.

NOTE: Specific information requirements and details on different aspects of the system losses considered necessary for the regulatory and technical evaluation of the system losses proposals are outlined in subsequent sections of this Criteria.

System Losses Mitigation Strategy

The company's system losses mitigation strategy to be presented in the 2024-2029 Rate Review Application should incorporate, among other things, the following requirements:

1) The overall loss reduction programme/projects supporting the 2024-2029 targets, should be practical and credible. The company shall also provide justification for each loss reduction project/initiative, which should be substantiated by, among other things, the respective feasibility studies, cost benefit analyses, rate impact analysis, and software simulation files.

2) All proposed 2024-2029 capital projects for system losses reduction (TLs and NTLs) included in JPS's 2024-2029 Rate Review Application shall conform with the Capital Projects' requirements set out in this Criteria.

3) The company shall provide a detailed description of its proposed 2024-2029 loss reduction programme/projects (for TLs and NTLs), to include project costs, loss reduction impact, start date, duration, etc.

4) The proposed loss reduction measures should be in line with the forward-looking goal of reducing system losses to minimum thresholds or benchmark levels that are economically sustainable.

5) During the review period, the company shall submit to the OUR quarterly progress reports on the implementation status of the approved 2024-2029 loss reduction projects.

A3.8 OUR's EVALUATION OF JPS's PROPOSED SYSTEM LOSSES TARGETS

The scope and objective of the OUR's evaluation of JPS's system losses proposals included in the 2024-2029 Rate Review Application, will encompass following:

1) Initial regulatory review of JPS's 2024-2029 system losses proposals and supporting schedules within the allowed 10-working day period after the date of submission of the 2024-2029 Rate Review Application (Schedule 3 paragraph 7 of the Licence), for adequacy and completeness, and to ascertain whether they meet the requirements of the Criteria and Licence , so as to determine overall acceptability of the Rate Application.

2) Upon acceptance of JPS's 2024-2029 Rate Review Application by the Office, the OUR will embark on a comprehensive technical evaluation of the 2024-2029 system losses proposals in accordance with the legal and regulatory requirements, to:

    a. validate whether JPS's proposed Q-Factor baseline, annual reliability performance forecast, and the proposed annual Q-Factor targets, meet the "reasonable and achievable" condition, and are consistent with the configuration and operating capability of the electricity system, assumed by the company for the subject review period.

    b. assess JPS's overall system losses performance during the 2019-2024 review period, which will focus on the different components/categories of energy losses (sources/causes, loss levels and trajectory, etc.), the status and impact of the 2019-2024 loss reduction projects/initiatives (TLs and NTLs), and the resulting effects on ratepayers. The findings emanating from this review will inform the OUR's determinations on system losses for the 2024-2029 Rate Review period.

    c. evaluate/analyze JPS's 2024-2029 system losses proposals and related loss reduction plan to support the setting of the annual targets, as required by the Licence.

Evaluation Approach

1) In general, the OUR's assessment of JPS's system losses proposals included in the 2024 - 2029 Rate Review Application, will be based on detailed "technical-economic" evaluation/analyses in order to determine optimal system losses targets for the company and to establish a credible loss reduction trajectory for the review period.

2) The OUR's technical evaluation of the system losses proposals will be carried out using the system losses data, system operations data, information, study reports and schedules provided by JPS, and other available system losses data, and with the application of established methods, models, and tools.

Evaluation of JPS's Technical Losses Targets Proposals

1) The OUR's approach for evaluating JPS's proposed TLs targets will take into consideration the information requirements set out below. As such, the company shall include this information in the Rate Review Application submitted to the OUR.

2) The proposed TLs targets will be evaluated using technical-economic methodologies, with the aim of deriving annual TLs targets that are reasonable and representative, and to determine the optimum level of TLs achievable in the T&D network.

Information Requirements – TLs Evaluation

To facilitate the OUR's technical evaluation of the proposed 2024-2029 TLs targets, the following information and details are required and shall be included in the Rate Review Application:

Transmission Network Technical Losses

a. A detailed breakdown showing the average TLs measured/calculated for each transmission line, substation transformer, and other relevant equipment/apparatus installed in the Transmission System, for each month in the base year and each year of the 2024-2029 review period. This TLs breakdown shall be properly structured and compiled in MS Excel format.
b. Methodology for Modelling and Measuring Transmission Network TLs:
    i. The company shall provide a detailed description of the methodology used to measure TLs in the Transmission System (base year value and forecast for 2024-2029).
    ii. The company shall provide documentary evidence of the meter readings and measurements used to determine the total transmission network TLs for the base year. This data shall clearly show the specific meter readings and measurements associated with the TLs reported for each transmission line in the power system.
    iii. The company shall provide the full reports/results, network models, inputs/assumptions, and software simulation files for System studies (Load Flow studies, Optimal Power Flow analyses, Security Contingency analyses, etc., utilizing DigSILENT PowerFactory software or equivalent), executed based on the existing and projected System configuration, to rationalize its transmission network TLs forecast for 2024-2029 and proposed TLs targets.
c. Details on the company's approach for the reconciliation and validation transmission TLs, due to deviations between the energy injected into the network and the energy outflows.

d. Any other relevant information.

All the required information shall be included in the 2024-2029 Rate Review Application.

Primary (MV) Distribution Network Technical Losses

a. A detailed breakdown showing the average TLs for each feeder in the Distribution System (including primary lines and distribution transformers, and other connected equipment), for each month in the base year and each year of the 2024-2029 review period. This TLs breakdown shall be properly structured and compiled in MS Excel format.
b. The "Peak Power Loss" and Load Factor (LF) of the primary (MV) distribution network.
c. **Methodology for Modelling and Estimation of the MV Distribution Network TLs**:
    i. The company shall provide a detailed description of the methodology used to measure/calculate TLs in the primary distribution network (base year value and forecast for 2024-2029).
    ii. The company shall provide all the measurements/calculations used to estimate the total primary network TLs for the base year. This data shall separately show the specific measurements/calculations associated with the TLs reported for the primary (MV) distribution lines and the distribution transformers, in the System.
    iii. The company shall provide the full reports, network models, inputs/assumptions, and software simulation files for Distribution System studies (using Geographic Information System (GIS) software, DigSILENT PowerFactory software or equivalent, and other applicable software tool), executed based on the existing and projected electricity system configuration, to inform its primary distribution network TLs forecast and proposed TLs targets, for the 2024-2029 Rate Review period.
d. Technical reports/data on distribution network "Energy Balance" assessments.
e. Any other relevant information

All the required information shall be included in the 2024-2029 Rate Review Application.

Distribution Transformers

For the evaluation of the distribution transformers TLs, the company shall provide the details for the transformers:

a. Capacity rating of each transformer (full load capacity)
b. Peak loading of each transformer
c. Fixed and variable losses of transformer types of each rating
d. No load loss of each transformer type
e. Utilization Factor (UF)
f. Load Factor (LF)
g. Load Loss Factor (LLF)

All the required information shall be included in the 2024-2029 Rate Review Application.

Secondary (LV) Distribution Network Technical Losses

Based on the orientation of the secondary distribution network, it is recognized that it poses several challenges to the calculation of TLs in this segment of the electricity system. According to information provided by JPS in 2019, this section of the distribution network is not mapped or modelled to facilitate any form of computer load simulation. Due to this deficiency, over the years, the company has adopted a "rule of thumb" approximation approach and/or standards governing conductor type, length per circuit, average loading per circuit and the number of secondary distribution circuits, to estimate the level of TLs in the secondary distribution network.

Notwithstanding, the OUR is of the view that the TLs estimation methodology described by JPS involves several problems, including the following:

- The same level of TLs (2.9%) has been reported by the company for over fifteen (15) years, which presumes no change in the secondary distribution network configuration, loading and loss profile, over time.
- The reported TLs do not appear to reflect the impact of the large-scale deployment of the advanced revenue meters (AMI), and the smart LED streetlight programme, as well as the effect of distributed generation (DG) at the secondary distribution level, supplied under the Net Billing arrangement.
- The impact of secondary circuits avoided due to RAMI installations and the increased use insulated secondary conductors and service cables does not appear to be reflected in the reported TLs.
- The company reported that it has commenced process of mapping/modelling the secondary circuits, based on other objectives, including reliability measurements and NTL reduction goals, but it does not appear that any update or calibration of the estimation methodology has been done following such developments.

Given the constraints impeding the proper modelling of this network segment and the methodology for estimating the related TL, the OUR accepts that presently, some level of approximation may be unavoidable. Having regard to the relevant regulatory requirements and prudent utility practice, any TLs estimation approach employed by the company must be transparent, based on reasonable assumptions, and structured to quickly incorporate updated network data.

Information requirements - Secondary Distribution Network TLs

To facilitate the evaluation of the proposed 2024-2029 TLs targets, the following items of information shall be included in the Rate Review Application:

a. A breakdown of the total secondary distribution network TLs and supporting data, compiled in the template represented as Table 1 below.
b. A detailed description of the methodology used to estimate the TLs for each component.
c. An update on the status of the secondary network mapping/modelling project being undertaken by the company.

Table 1: Template for Breakdown of Secondary Distribution Network TLs

TEMPLATE FOR BREAKDOWN OF SECONDARY DISTRIBUTION NETWORK TLS							
Description	Number of Circuits or Devices	Length per Circuit	Average Loading per Circuit	Average Peak Loss (kW)	Total Average Peak Loss (kW)	Annual Energy Loss (kWh)	% TLs
Secondary Circuits							
Service Drop (Residential)							
Service Drop (small Comm)							
Service Drop (medium Comm) 3-phase							
Service Drop (large Comm) 3-phase							
Metering Devices (at service connections)							
TOTAL							

Information Requirements for Optimum TLs

a. Technical-economic assessments to determine the optimal level of T&D TLs achievable up to the end of 2029 and 2034, based on the assumed configuration of the T&D network over the stated disparate periods, to be conducted by the company. The assessment reports, including the findings and results shall be submitted in the Rate Review Application.
b. Cost-benefit analysis addressing the effectiveness of the incremental investment cost for the TL reduction programme relative to the benefits to be derived from the expected TLs reduction trajectory down to the optimal TL level, to be conducted by the company. The report for this analysis shall be submitted in the Rate Review Application.
c. The scope of the TL optimization assessment should:
    i. cover only TLs in the transmission system, primary (MV) distribution lines, distribution transformers, secondary distribution network.
    ii. demonstrate reduction in total T&D TLs to economic (optimum) level.

Considerations for TLs Reduction Plans/Programmes

1) The proposed TL reduction plans and programmes to be implemented by the company during the 2024-2029 Rate Review period, should take into consideration, among other things, the following:
    a. Power factor assessment and correction to achieve limits specified in Electricity Sector Codes:
    b. Volt/VAR optimization (VVO)
    c. Primary distribution voltage standardization
    d. Distribution transformer load management
    e. Substation efficiency
    f. Replacement of high impedance power transformers
    g. Measures to reduce primary distribution conductor loading
    h. Feeder phase balancing
    i. Reconfiguration to reduce secondary conductor loading
    j. Measures to reduce transmission conductor loading
    k. Smart metering – to improve measurement and reduce TLs
    l. Improved modelling of the high voltage (HV) network
    m. Improved modelling of secondary distribution network

JPS 2019-2024 TLs Reduction Projects

1) A detailed report on status of the TLs reduction projects approved for implementation during the 2019-2024 review period, up to 2023 December, covering the scope, costs, benefits, and the resulting loss reduction impact, in each case.

2) This report shall be included in the 2024-2029 Rate Review Application

Methodology for developing the TLs Targets

1) A detailed description of the methodology/models used by the company to develop the annual TLs targets for the 2024-2029 Rate Review period.

Other Requirements for TLs Evaluation

1) A detailed report on all Ls reduction initiatives and approved projects currently in progress, including commencement date, projected completion date, capital expended and corresponding loss reduction impact, up to 2023 December.

Evaluation of JPS' Non-Technical Losses Proposals

The Non-Technical Losses Problem

- NTLs as defined herein continues to be problematic for the Jamaican Electricity System, for a multiplicity of reasons. Notwithstanding, a significant portion of these losses can be avoided by the utility company with the implementation of appropriate mitigation measures.

- Based on reported system losses data, NTLs currently account for a substantial proportion (approximately 72%) of total annual system losses, which has several perverse consequences. Considering the undesirable effects, urgent and unwavering action, in particular, the deployment of robust and targeted loss reduction strategies, is critical to alleviate the problem, through tangible reductions and eventual elimination of NTLs.

- From an economic perspective, the realization of material reductions in NTLs, would undoubtedly translate to favourable outcomes for JPS, manifested both in terms of its overall operational efficiency and financial sustainability, as well as the added benefits gained from freed up T&D network capacity, to enable the company to meet its service obligations under the Licence.

- Despite such considerations, it must be underscored that the existing treatment of NTLs tends to introduce the condition of inefficient electricity pricing, due to the disproportionate burden of cost subsidization borne by ratepayers. That is, legitimate customers who are billed for electricity usage and are regularly paying their bills, are required to subsidize the energy costs associated with NTLs caused by "illegal users" involved in the unauthorized access to the network and illegal abstraction of electricity.

Requirements for Evaluating JPS Non-Technical Losses Targets

1) The OUR's approach for evaluating JPS's proposed NTLs targets will take into consideration the information requirements set out below. As such, the company shall include this information in the Rate Review Application submitted to the OUR.

2) The proposed NTLs targets will be evaluated using technical, economic, and statistical methodologies, with the aim of deriving annual NTLs targets that are reasonable and representative.

Non-Technical Losses Components/Categories

According to JPS's system losses data and ELS, total NTLs are largely due to energy losses that occur in three main areas:

1. NTLs due to Billed Customers – energy losses resulting from metered service (RT10, RT20, RT40, 50 & 70, and RT60);
2. NTLs due to Internal Losses – energy losses attributable to JPS internal processes/operations; and
3. NTLs due to Illegal Users – energy losses due to illegal abstraction of electricity by non-customers.

For regulatory treatment of NTLs, as per Schedule 3, paragraph 38 of the Licence, the total NTLs are separated into two distinct categories:

a. The aspect of NTLs that are within the control of JPS - designated as "JNTL"
b. The aspect of NTLs that are not totally within the control of JPS – designated as "GNTL"

These NTLs components/categories will be central to the OUR's evaluation of JPS's proposed 2024-2029 NTLs forecast and annual targets for the subject review period.

Information Requirements - NTLs

To facilitate the evaluation of the proposed 2024-2029 NTLs targets, the following items of information shall be included in the 2024-2029 Rate Review Application:

a. A detailed breakdown of the total NTLs into the respective components (as per the ELS model) and supporting data (number of customers, billed sales, net generation, etc.), for each month in the base year and each year of the 2024-2029 review period, which shall be properly structured and compiled in MS Excel format.
b. A full breakdown of the total number of Advanced Meters (AMI), including Transformer/Total Meters, and "Check Meters" installed in the electricity network under the "Smart Meter Programme" up to 2023 December 31, broken out by Customer Class and by Parish/Service Area.
c. Methodology for Estimating NTLs: The company shall provide a detailed description of the methodology and assumptions used to estimate each component of the NTLs in the base year and 2024-2029 forecast.
d. The full report for the independent study on NTL due to Illegal Users, requested in the 2019-2024 Rate Review Determination Notice.
e. A detailed report on all NTLs reduction initiatives and approved projects currently in progress, including commencement date, projected completion date, capital expended and corresponding loss reduction impact, up to 2023 December.
f. Any other relevant information.

JPS 2019-2024 NTLs Reduction Projects

1) A detailed report on status of the NTLs reduction projects approved for implementation during the 2019-2024 review period up to 2023 December, covering the scope, costs, benefits, and the resulting loss reduction impact, in each case.

2) This report shall be included in the 2024-2029 Rate Review Application

Methodology for developing the TLs Targets

1) A detailed description of the methodology/models used by the company to develop the annual NTLs targets for the 2024-2029 Rate Review period.

Considerations for the Treatment of NTLs

The regulatory treatment of the NTLs will take into account, among other things, the following:

a. The full scope of the NTLs for the base year and the annual projections for the 2024-2029 Rate Review period.
b. The loss drivers and causation factors;
c. Accuracy of total customer count and number of customers in each rate class, contributing to "Billed Customer" NTLs;
d. The methodology used to estimate NTLs due to "Illegal Users" for the base year and the trajectory for 2024-2029;
e. The company's energy accounting and validation process, down to the distribution transformers and service meters;
f. The facilities available to the company for energy/revenue recovery;
g. The learning and impact resulting from the large-scale deployment of AMI, smart energy measurement devices, in the network, enhanced by Analytics applications during the 2029-2024 review period;
h. JPS's overall NTLs reduction plans and projects for 2024-2029; and
i. Approach for apportioning total NTLs into JNTL and GNTL.

A3.9 MODES AND SOURCES OF NTLs

Based on indications from system losses reports/data provided by JPS over last three (3) Rate Review cycles, the main sources/factors contributing to NTLs include:

- Defective Metering Equipment (meters, CTs, PTs, etc.)
- Burnt/Damaged Meter
- Meter Tampering/Bypass
- Inverted Meter
- Incorrect Metering Configuration
- CT Cross Phasing
- Single Phasing
- Open Circuit
- Bypass at/before Pothead
- Line Taps

These sources/modes of NTLs have been found to be the primary drivers of NTLs attributable to "Billed Customers" (metered service accounts). Since the start of the 2019-2024 Rate Review period, each year, this category of NTLs has consistently accounted for approximately of 7.5% of annual net generation, which considered to be very high and unsustainable. Under the circumstances, this is very concerning, given the amount of capital and resources that have been deployed to address this issue.

Salient Points:

NTLs due to Billed Customers

1) The NTLs datasets provided by JPS have consistently shown that energy losses due to "Billed Customers" (RT10, RT20, RT40, 50 & 70, and RT60), have largely resulted from regular supply/service connection faults, meter infrastructure configuration problems & defects, and detectable meter irregularities, which can be corrected and mitigated, and are totally within JPS's control.

2) Moreover, all the large C&I accounts (Rate 40, 50 and 70) and medium C&I (Rate 20) accounts are metered with AMI systems possessing advanced monitoring capabilities and "analytics", some of which are also monitored by "check meters". These advanced functionalities, effectively provide the company with a high degree of visibility and intelligence to monitor these accounts and immediately detect irregularities that contribute to NTLs.

3) As a result of the 2019-2024 Smart Meter Programme, a large percentage of the Rate 10 and 20 accounts are now metered with AMI devices that also advanced monitoring capabilities supported by Analytics, providing the company increased visibility to detect certain irregularities that contribute to NTLs.

4) The nature of most of the identified sources/modes of NTLs, infers that a significant portion of the recorded energy losses due to "Billed Customers" are regarded as "recoverable" losses. Accordingly, JPS should account for these losses as "recoverable energy" since they have been identified and quantified and can be translated to "billed revenue", to be recovered from the specific customers involved, instead of carrying them forward as existing losses in the ELS. To be clear, these detected energy leakages should not be registered as NTLs, on the basis that they can be quantified and billed to the relevant customers, for recovery of the associated revenues by JPS.

5) In dealing with NTLs caused by these sources, JPS also has the opportunity to the recover loss revenues associated with these energy losses by means of adjustments in accordance with the relevant "Back Billing Policy" or other permissible means available to the company for redress.

6) The NTLs data also indicates that the total number of customer accounts audited/investigated by JPS annually have been exceeding the targets specified in the Licence (Schedule 2, Overall Standards - EOS7a & EOS7b). The increased number of annual meter/account audits and investigation activities should allow the company to gather more valuable information, to enhance its energy loss detection programme, data analytics, and mitigation strategy.

7) The high penetration of AMI devices/systems in the network which under the direct management and control of JPS, should be yielding significant reductions in NTLs caused by the sources/causes listed above.

8) Given the factors and considerations highlighted, the OUR is of the view that NTLs resulting from the identified sources and modalities are directly within the control of JPS, and there are practical/means available to the company to curtail these energy losses on sustained basis.

9) All the above issues and factors will be taken into consideration in the regulatory treatment of total NTLs.

NTLs - JPS Internal Losses

1) As defined by JPS (Loss Spectrum Methodology – JPS 2019-2024 Rate Review Application), "Internal Losses" consist of losses incurred due to actions or inactions on JPS's part, and include errors in billing, account setup, meter reading and inadequate maintenance. According to JPS, the ELS model determines the losses for each of the other categories and allocates the remainder to Internal Losses, meaning that the Internal Losses consist of JPS's internal losses and the estimation error for all the other loss categories.

2) Notably, in the 2018-2019 Annual Review Filing, the company confirmed that it accepts full responsibility for NTLs caused by Internal Losses. Despite that concession, this category of NTLs continues to prevail at unacceptable levels, although these losses can be eliminated through appropriate action and mitigation, without insurmountable challenges.

3) Notwithstanding, as per definition, NTLs due to Internal Losses are considered to be totally within the control of JPS, which will be taken into consideration in the regulatory treatment of overall NTLs.

NTLs due to Illegal Users

1) According to JPS, NTLs due to Illegal Users is caused by unauthorized access to the electricity network, and the illicit abstraction of electricity. As reported in the annual ELS, on average, these losses represent over 12% of annual net generation, caused by approximately 180,000 illegal electricity consumers.

2) Due to the nature and orientation of these NTLs, the company is required to put forward a systematic approach for proper quantification, together with innovative strategies to cost effectively eliminate a significant portion of these losses. This shall be included in the 2024-2029 Rate Review Application.

3) Given the irregularities involving this category of NTLs, it is considered to not totally within the control of JPS. This will be taken into consideration in the regulatory treatment of overall NTLs.

A3.10 REGULATORY TREATMENT OF NTLs

Subject to the provisions of the Licence, in setting the relevant system losses targets, the OUR is required to determine the portion of total NTLs that is within the control of JPS and the component that is not totally within its control.

Accordingly, the regulatory treatment of the NTLs will take into consideration, among other things, the following factors:

1) The relevant provisions of the Licence.
2) The established regulatory principles pertaining to the treatment of NTLs.
3) Regulatory precedence in the treatment of NTLs (OUR's previous Determination Notices).
4) The specific sources/modes of the different categories of NTLs, and the available facilities to accommodate energy/revenue recovery, as described herein.
5) JPS/GOJ NTLs loss mitigation strategy.
6) Requirements on the treatment of NTLs in the Final Criteria for JPS 2019-2024 Rate Review.

OUR's Allocation of NTLs

The OUR's position on the allocations for the different categories of NTLs is set out below:

NTLs due to Rate 60 Service

Based on the factors outlined and the existing framework for system losses, the OUR maintains that NTLs due to Rate 60 (Streetlight/Stoplight) service are totally (100%) within the control of JPS and can be eliminated through appropriate action and mitigation. Also, the implementation of the Smart Streetlight Programme (SSP) as a major efficiency initiative is also expected to eliminate energy losses in this category. Accordingly, for the Rate Review period, NTLs due to Rate 60 service will be allocated as follows:

<u>Rate 60 NTLs Allocation</u>

- Rate 60 NTLs distribution: JNTL = 100% and GNTL = 0%
- This implies that this component of NTLs will NOT be included in the relevant NTL targets

NTLs due to Large C&I Customers (Rate 40, 50 & 70)

Based on all the factors described and the existing framework for system losses, the OUR maintains that NTLs associated with large C&I accounts (Rate 40, 50 & 70) are totally (100%) within the control of JPS and can be eliminated through appropriate action and mitigation. Accordingly, for the Rate Review period, NTLs due to large C&I customers will be allocated as follows:

<u>Rate (40, 50 & 70) NTLs Allocation</u>

- Rate (40, 50 & 70) NTLs distribution: JNTL = 100% and GNTL = 0%
- This allocation implies that NTLs caused by medium C&I customers (Rate 20 accounts) will NOT be included in the relevant NTLs targets

NTLs due to Medium C&I Customers (Rate 20)

Based on all the factors described, the OUR maintains that NTLs due to Medium C&I customers (Rate 20) are totally (100%) within the control of JPS and can be eliminated through appropriate action and

mitigation. In that regard, for the Rate Review period, NTLs due to medium C&I customers will be allocated as follows:

Rate 20 NTLs Allocation

- Rate 20 NTLs distribution: JNTL = 100% and GNTL = 0%
- This distribution implies that NTLs caused by medium C&I customers (Rate 20 accounts) will NOT be included in the relevant NTLs targets

NTLs due to Small C&I (Rate 20)

Due to the number of customers in this NTLs category and the less than 100% AMI coverage for these service accounts, some constraints would be faced by the company to fully control this component of NTLs. In that regard, the OUR will apportion these NTLs based on updated information/datasets on the nature and causes of NTLs obtained from field investigations, the 2024-2029 NTL reduction plan, and the penetration of AMI meters for the Small C&I (Rate 20) accounts. This information shall be provided in the 2024-2029 Rate Review Application.

NTLs to due Rate 10 (Residential)

Due to the number of customers in this NTLs category, geographical dispersion of the service locations, and the less than 100% AMI coverage for these service accounts, some constraints would be faced by the company to fully control this component of NTLs. In that regard, the OUR will apportion these NTLs, based on updated information/datasets on the nature and causes of NTLs obtained from JPS field investigations, the 2024-2029 NTL reduction plan, and the penetration of AMI meters for the residential (Rate 10) accounts. This information shall be provided in the 2024-2029 Rate Review Application.

NTLs due to Illegal Users

Having regard to the existing framework and all the factors described, it can be inferred that NTLs due to Illegal Users are not totally within the control of JPS. Based on the nature and sources of these losses, they will be largely apportioned to GNTL. However, this allocation will be premised on, among other things, the following requirements:

a. Relevant System performance data
b. JPS' 2021-2023 NTLs datasets obtained from field investigations
c. The specific sources and modes of NTLs due Illegal Users
d. The methodology used to estimate the total number of Illegal Users and the related level of energy losses for the base year and each year in the 2024-2029 Rate Review period.
e. JPS/GOJ proposed curtailment strategy for these NTLs.

NTLs Classified as Internal Losses

Based on all the factors described and the existing framework for system losses, the OUR maintains that NTLs attributable to Internal Losses (as defined) are totally (100%) within the control of JPS and can be eliminated through appropriate action and mitigation. Accordingly, for the Rate Review period, NTLs classified as Internal Losses will be allocated as follows:

JPS Internal NTLs - Allocation

- JPS Internal NTLs distribution: JNTL = 100% and GNTL = 0%
- This allocation implies that JPS Internal NTLs will NOT be included in the relevant NTLs targets.

Considerations for Allocating NTL to JNTL and GNTL

For validation of NTLs levels, allocation of NTLs into JNTL and GNTL, and the evaluation of the 2024-2029 NTLs curtailment/mitigation strategy, the OUR will consider, among other things, the following factors, and conditions:

- The apportionment of NTLs into JNTL and GNTL to support the setting of the relevant system targets for the 2024-2029 Rate Review period, will be guided by the OUR's treatment of NTLs outlined above.
- JPS's proposed distribution factors for JNTL and GNTL (forecast and targets) and supporting data.
- JPS's 2021-2023 and 2024 January-March NTLs datasets on the sources and modes of NTL detected during field investigations, including evidence to demonstrate the authenticity of the data.
- The results of the OUR's technical, economic and statistical evaluation/analysis on JPS's NTLs proposals and data.

A3.11 OUR's DETERMINATION OF SYSTEM LOSSES TARGETS

Determination of Technical Losses Targets

Following the completion of its evaluation/analysis of JPS's 2024-2029 TLs proposals and supporting data, the OUR will determine the annual TLs targets for JPS to be applied in the PBRM during the 2024-2029 Rate Review period, as prescribed by the Licence. In making its determination, the OUR will take into consideration, among other things, the following:

1) The relevant provisions of the Licence;
2) The results/findings of the OUR's TLs evaluation;
3) JPS' long-term TL reduction plan, including investment levels, use of advanced technologies, projected loss reduction impact, and initiatives listed above;
4) The results of TL optimization simulations and analyses referenced above;
5) Benchmark indicators for TLs; and
6) The impact of existing and planned Distributed Generation (DG) on overall TLs.

Determination of Non-Technical Losses Targets

After completing its evaluation/analysis of JPS's NTLs proposals, the OUR will determine the annual NTLs targets for JPS to be applied during the 2024-2029 Rate Review period, as prescribed by the Licence. In making its determination, the OUR will take into consideration, among other things, the following:

1) The relevant provisions of the Licence.
2) The results of the OUR's NTLs evaluation.
3) The OUR's position on the treatment of NTLs outlined above.
4) JPS' long-term NTLs reduction plan, including investment levels, use of advanced technologies and projected loss reduction impact.

5) The initiatives of the GOJ in addressing the aspect of NTL that are not entirely within the control of JPS.
6) Relevant System performance data and field investigation data on NTLs.
7) Benchmark indicators for NTLs.
8) The level of penetration of AMI devices/systems.

A3.12 RESPONSIBILITY FACTOR

In accordance with the provisions of Schedule 3, Exhibit 1 of the Licence, the OUR's determinations on the responsibility factor (RF), will take into consideration, among other things, the following:

a) Nature and causes of NTLs determined to be not totally within the control of JPS (GNTL).
b) The roles of JPS and the Government to reduce this aspect of NTLs.
c) The actions that were supposed to be taken and the resources allocated in the previous 5-year Business Plan.
d) The actual actions and the resources spent by the JPS.
e) The actual cooperation by the Government.
f) Change in external environment affected losses.
g) Information obtained from consultations with JPS and GOJ on GNTL.
h) JPS/GOJ proposed strategy and measures to reduce GNTL.

ANNEX 4 - CRITERIA FOR JPS HEAT RATE, H-FACTOR AND FCAM 2024-2029 RATE REVIEW

A4.1 INTRODUCTION

Background

The two-part pricing arrangement defined by the existing "price controls" for JPS, places significant emphasis on non-fuel rate components. However, the fuel side of the business, which can account for over 50% of the total cost of service (COS), tends to not attract that level of coverage, for obvious reasons.

Notwithstanding, given the considerable contribution of fuel costs/rates to customers, it is imperative that measures and mechanisms are put in place to ensure the pass-through of efficient and reasonable fuel cost to ratepayers.

For JPS, the established regulatory mechanism for the treatment of fuel use efficiency is incorporated in the price control mechanism defined in the Licence, under which, the OUR is required to develop specific criteria for determining heat rate targets, for efficiency adjustments. That is, to allow for the pass-through of efficient and prudent fuel costs to customers.

Against that background, these criteria are deemed important and necessary for establishing the requirements/conditions for Heat rate and H-Factor determination and application in the rate adjustment process.

Regulatory Context

In accordance with the provisions of the Licence applicable to the Fuel Rate Adjustment aspect of the existing price control regime, at each Annual Review during a 5-year revenue cap period, the Office is required to determine the H-Factor, as necessary, to reflect the applicable heat rate (whether thermal, system, individual JPS plants, or other such methodology, as per Schedule 3 Paragraph 40 of the Licence) versus the pre-established yearly targets in the 5-year Rate Review Determination. Where, the relevant heat Rate target and H-Factor is applied in the defined Fuel Cost Adjustment Mechanism (FCAM) used to determine the monthly fuel rates (J$/kWh) during each Annual Review adjustment period.

As stipulated in Schedule 3, of the Licence, which defines the price control mechanism for JPS, the Office shall apply a H-Factor in the monthly calculation of the Fuel Rate Adjustment during a 5-year Rate Review period. To satisfy this requirement, the Office is required to establish the applicable heat rate target in the 5-year rate review determination. According to the Licence, targets set by the Office for heat rate shall normally be done by the Office at the Rate Review.

To implement this fuel rate adjustment process, the OUR must first establish the relevant heat rate targets. In doing so, the OUR pursuant to the provisions of the Licence, is required to establish the criteria for evaluating JPS's heat rate proposals to inform the setting of the relevant targets for application in the approved FCAM during the Rate Review period.

In that context, these criteria are developed to provide specific guidance on the requirements/conditions for the heat rate proposals to be included in the 2024-2029 Rate Review Application and for the related regulatory evaluation to be performed by the OUR during the Rate review process, to assure transparency, consistency, predictability, and fairness in the tariff process. Essentially, these system losses criteria outline the specific technical requirements for developing the annual heat rate targets to be included in the 2024-2029 Rate Proposal (Schedule 3, paragraph 11 of the Licence), and the regulatory approach for setting the relevant targets, as required by the Licence.

The Heat Rate Criteria

The applicable heat rate criteria are set out in the following sections.

A4.2 DEFINITIONS: HEAT RATE and H-FACTOR

In general, heat rate represents a fuel conversion efficiency measure which is a function of the operation of generating plants in an electricity system.

Generating Plant Heat Rate

A generating plant heat rate is a measure of its technical efficiency. Specifically, it involves the amount of fuel energy input (BTU or KJ) used by the plant to generate one (1) kWh of electricity, which is represented in the equation below.

$$\boldsymbol{Heat\ Rate(BTU|kWh)} = \frac{\boldsymbol{Energy\ Input\ (BTU|h)}}{\boldsymbol{Power\ Output\ (kW)}}$$

Based on this equation, a lower heat rate means that less fuel is used per kWh of electricity, and this translates to higher efficiency and reduced fuel expenses. Importantly, heat rates are not the same for all generating plants. Generating units used for peaking purposes, such as gas turbines (GTs), generally have higher heat rates than their baseload counterparts, which are normally more efficient. The existence of these differences in heat rates underscores the importance of the generation supply mix and optimal generation dispatch.

The average heat rate of a generating unit is determined based on its operation subject to its "Input – Output" curve.

System Heat Rate

This relates to the average heat rate of the entire generation system for a specified period of operation and is dependent on the average heat rate and net energy output (NEO) of each generating unit dispatched.

H-Factor

As defined under Schedule 3, paragraph 46(b), of the Licence, the H-Factor, if applicable will reflect the heat rate, as defined by the Office, of power generated in Jamaica versus a pre-established yearly target in the 5-year setting determination by the Office. The H-Factor can be represented mathematical as follows:

$$H - Factor = \frac{Heat\ Rate\ Target}{Heat\ Rate\ Actual}$$

Where,

Heat Rate Target: represents a threshold heat rate value used to gauge the efficiency performance of a power generating plant or a group of power plants. For JPS's generation operations, the heat rate target is determined by OUR in accordance with the requirements of the Licence.

Heat Rate Actual: as per the definition above, it represents the average generating heat rate of JPS's combined thermal plants utilized in the production of electricity each month.

A4.3 CRITERIA CONDITIONS

1) This heat rate Criteria defines the key information requirements and procedures that:
   a) should guide the company in developing the heat rate and H-Factor proposals for the 2024-2029 Rate Review.
   b) provide the framework for the evaluation and determination of the relevant heat rate targets for the new price control period.

2) The company shall comply with all the requirements and conditions specified in this Heat Rate Criteria.

3) These criteria set out the minimum qualitative and quantitative requirements for setting the heat rate targets, prescribed in Schedule 3, paragraphs 37 and 39 of the Licence.

4) Before commencing the full Rate Review process, the target proposals and supporting schedules/documents submitted by the company will be thoroughly examined and reviewed to ensure that all the applicable criteria are met.

LICENCE REQUIREMENTS FOR HEAT RATE, Y-FACTOR AND FCAM

Power of OUR to Set Targets (Heat Rate)

Pursuant to Schedule 3, paragraph 37 of the Licence, the Office shall have the power to set targets for losses**,** "**heat rate**" and quality of service, where the targets set should be "reasonable and achievable" taking into consideration the Base Year, historical performance and agreed resources included in the five (5) Year Business Plan, corrected for extraordinary events. The Office shall also take into consideration the role of the GOJ in addressing the non-technical aspect of the system losses that are not entirely within the control of JPS.

Conditions for Heat Rate Targets

1) Schedule, paragraph 39 of Licence:

   "The target set by the Office for heat rate… shall normally be done at the Rate Review for each of the five (5) years and broken out year by year."

2) Schedule 3, paragraph 40 of Licence:

"The Office shall determine the applicable heat rate (whether thermal, system, individual generating plants of the Licensee or such other methodology) and the target for the heat rate."

Based on these Licence provisions, during the Rate Review process, the OUR is required to establish a heat rate forecast for the 5-year review period and the applicable annual targets.

Fuel Cost Adjustment Mechanism (FCAM)

The regulatory provisions which establish the linkage between the fuel cost adjustment mechanism (FCAM), which involves the H-Factor and the fuel rates, are defined in Schedule 3, paragraphs 3 and 5 of the Licence, which provides as follows:

1) Paragraph 3:
"The fuel rate shall be adjusted by the Office monthly in accordance with the Fuel Cost Adjustment Mechanism"

2) Paragraph 5:
"All rates shall be determined by the Office."

The fuel rate as referenced in these provisions relates to the costs of fuel consumed to produce the electricity supplied to customers. Where, the pass-through of such costs for a given operating period (typically one month) is subject to efficiency adjustment by the H-Factor (the quotient of the heat rate target divided by the actual heat rate) in the applicable fuel cost adjustment mechanism (FCAM). Given the importance of this FCAM construct in the rate adjustment process, it is considered to be an integral part of these criteria.

Monthly Adjustment to Fuel Rates

As stipulated by the Licence, JPS shall adjust the fuel rate each billing period (month) in accordance with the applicable FCAM. In satisfying the requirement, the OUR is required to define and approve the methodology to be used for the derivation of monthly fuel rates during the relevant Rate Review period.

Requirements for Calculation of Monthly Fuel Rates

According to Schedule 3, paragraph 57 of the Licence, the monthly calculation of the Fuel Rate Adjustment, including the Schedule for application of these changes to each rate class, shall be submitted by JPS to the Office within ten (10) days of the start of each billing month and become effective on the first billing cycle on the applicable month.

Further, paragraph 58 of Schedule 3, states that the details of how these adjustments should be calculated are reflected in Exhibit 2 of the Licence.

Methodologies for Monthly Adjustments to Fuel Rates

Schedule 3, Exhibit 2 of the Licence provides two (2) distinct approaches for the monthly adjustment of the fuel rates, which are outlined as follows:

FCAM Methodology - Option 1

*"A. **Alternative 1** Fuel Cost Adjustment Mechanism*

The cost of fuel per kilo-watthour (net of efficiencies) shall be calculated each month on the basis of the total fuel computed (inclusive of fuel additives) to have been consumed by the Licensee and Independent Power Producers (IPPs) in the production of electricity. Effective January 1, 2016, this will be calculated each month based on the Licensee's generating heat rate as determined by the Office at the adjustment date and the IPPs generating Heat Rate as per contract and system losses, as determined by the Office at the adjustment date, applied to the total net generation (the Licensee and IPPs). Effective July 1, 2016, this will be calculated each month based on the Licensee's generating heat rate as determined by the Office as at June 30, 2016 (each succeeding rate review date) and the IPPs generating as per contract."

The cost of fuel per kilo-watthour shall be computed on a monthly basis under the appropriate rate schedule in the following manner having regard to the applicable efficiency adjustments and effective dates as outlined in the paragraph:

"F = F_m/S_m

Where:

Billing Period = The billing month during the effective period for which the adjusted fuel rates will be in effect as determined by the Office.

F *= Monthly Fuel Rate in J$ per kWh rounded to the nearest one-hundredth of a cent applicable to bills rendered during the current Billing Period*

F_m *= Total applicable energy cost for period*

The total applicable energy cost for the Billing Period is:

(a) the cost of fuel, adjusted for the determined heat rate and system losses up to June 30, 2016, and which fuel is consumed in the Licensee's generating units or burned in generating units on behalf of the Licensee or incurred in relation to the Licensee's contractual obligation, such as but not limited to the minimum take-or-pay obligation under a gas supply agreement, for the preceding calendar month plus;

(b) the fuel portion of the cost of purchased power (including IPPs), adjusted for the contract Heat Rate, for the said preceding calendar month; and

(c) an amount to correct for the over-recovery or under-recovery of total applicable energy cost for a billing period, such amount shall be determined as the difference

between the actual total applicable energy cost for a given month adjusted for the determined Heat Rate the fuel costs billed for such month, using fuel cost and fuel weights.

(d) An amount to correct for the over-recovery or under-recovery of the non-fuel portion of the purchased power. This amount shall be determined as the difference between the actual IPP non-fuel cost for a given month and the estimated base non-fuel IPP charge billed to customers for such calendar month.

S_m = *the kWh sales in the Billing Period.*

The kWh sales in the billing period is the actual kWh sales occurring in the previous calendar month.

The Fuel Rate Adjustment including the Schedule for the application of the fuel charge to each rate class, shall be submitted by the Licensee to the Office ten (10) days prior to the end of the month just preceding the applicable billing month and shall become effective on the first billing cycle on the applicable billing month…"

FCAM Methodology - Option 2

*"**Alternative 2**[2]*

When a system wide heat rate will be established by the Office, the fuel cost portion of the monthly bill computed under the appropriate rate schedule will be calculated in the following manner:

$$"F = F_m/S_m$$

Where:

Billing Period = The billing month during the effective period for which the adjusted fuel rates will be in effect as determined by the Office.

F = *Monthly Adjustment Fuel Rate in J$ per kWh rounded to the nearest one hundredth of a cent applicable to bills rendered during the current Billing Period.*

F_m = *Total applicable energy cost for period (fuel, fuel additives, IPP and Take or Pay charges)*

S_m = *Total kWh sales for the period*

Where:

F_m = $FAct_{m-1}$ + over/under $billing_{m-1}$ + H

To drive optimal dispatch and minimize fuel cost and related losses the Licensee is incentivized to improve the Heat rate as reflected in the fuel pass through, the H-factor.

The monthly Heat Rate Incentive or H-factor will be calculated as follows:

*H = {(HR T - HR Act$_{m-1}$)/HR T} * FAct$_{m-1}$*

HRT = Heat Rate Target per year as established during the rate setting process

HR Act = Actual Heat-Rate prior month, corrected for items outside the Licensee's control; meaning higher than anticipated forced outages[3] at the IPP's or 3rd party generators that were part of the original HR target setting.

FAct$_{m-1}$ = The Actual energy cost incurred in the previous month (fuel, fuel additives, IPP and Take or Pay charges).

The Fuel Rate Adjustment including the Schedule for application of the fuel charge to each rate class, shall be submitted by the Licensee to the Office within ten (10) days of the start of each applicable billing month and shall become effective on the first billing cycle of the applicable billing month.

[2]When an independent system operator (ISO) would be established in Jamaica, the system heat rate target will become the target for such ISO, and for each JPS plant a heat rate target will be established as if it would be a (virtual) IPP.

[3]Where the Licensee gets to correct the heat rate for higher than anticipated forced outages the potential Liquidated damages of the IPPs become an off-set against the fuel charges (preferred solution), where the licensee would not get the heat rate relief the Licensee should be able to retain the Liquidated Damages paid by the (virtual) IPPs"

NOTE: Since the implementation of the Licence in 2016 (January 27), no Independent System Operator (ISO) for the Jamaican electricity system has been established, which would preclude the use of the Alternative 2 FCAM methodology. As such, Alternative 1 FCAM has been applied as the default option up to present time. From all indications, it will likely be this same FCAM option that will be applied during the 2024-2029 price control period.

FCAM FORMULA

The FCAM (Alternative 1) as defined under schedule 3, Exhibit 2 of the Licence (effective 2016 July 1), can be represented mathematically, as set out in the formula below:

$$\boldsymbol{Fuel\ Cost\ Pass\ Through} = \left[\boldsymbol{IPPs\ Fuel\ Cost} + \left(\boldsymbol{JPS\ Fuel\ Cost} \times \left(\frac{\boldsymbol{JPS\ Heat\ Rate\ Target\_Thermal}}{\boldsymbol{JPS\ Heat\ Rate\ Actual\_Thermal}}\right)\right)\right]$$

Embedded Efficiency Incentive Scheme

1) The fuel cost adjustment formula set out above allows JPS to recover its monthly fuel costs on a "dollar-for-dollar" basis, subject to efficiency adjustment by the H-Factor, through the monthly fuel rates.

2) As designed, the mechanism comprises an embedded incentive scheme that innately delivers financial rewards or penalties to the company to the extent that there is an over-achievement or under-achievement of the approved heat rate target, respectively, for a given year.

3) Intuitively, this efficiency adjustment construct also provides a reasonable incentive to the company to improve its fuel conversion efficiency as well as to optimize its overall cost of generation.

REGULATORY PRINCIPLES FOR HEAT RATE TARGETS AND APPLICATION

As previously indicated, the heat rate target is a key efficiency threshold applied to permit the efficient pass-through of the costs of fuel consumed in JPS's plants to its customers. The target is set by the OUR on a periodic basis to ensure that the fuel costs absorbed by electricity ratepayers are reasonable, prudent, and efficient. Another strategic objective of the heat rate target is to encourage JPS to consistently optimize its generation operations to ensure the minimization of total operating costs.

In recognition of these objectives, the OUR has adopted the following principles to guide the setting of the Heat Rate targets for JPS:

1) The targets should hold JPS accountable for the factors which are under its direct control;
2) The targets should encourage optimal generation dispatch of the available generating units to minimize the total cost of electricity generation;
3) The targets should take into account legitimate system constraints provided that JPS is taking reasonable action to mitigate these constraints;
4) The targets should normally be set at the Rate Review and reviewed at each Annual Review, and adjusted as applicable, to reflect changes in system configuration and on-going efficiency improvements; and
5) The targets should be "reasonable and achievable" and consistent with the design configuration and operating capability of the electricity system during the relevant price control period.

JPS HEAT RATE TARGETS PROPOSALS

The the company's heat rate proposals for the 2024-2029 Rate Review period must satisfy the requirements set out in this Criteria.

Conditions for the 2024-2029 Heat Rate Targets

1) The proposed heat rate targets shall cover all the months falling within the the-5-year 2024 – 2029 Rate Review period. To ensure alignment with the monthly fuel rate adjustment process during the Annual Reviews adjustment periods, the proposed heat rate targets shall be structured to reflect five (5) discrete 12-month targets for the following adjustment periods:
    a. 2024 July – 2025 June

b. 2025 July – 2026 June
c. 2026 July – 2027 June
d. 2027 July – 2028 June
e. 2028 July – 2029 June

2) At a minimum, the scope of the proposed targets must be consistent with the:
    a. system configuration, operating capabilities and generation & transmission constraints assumed for the Rate Review period.
    b. generation scheduling and dispatch assumptions/projections for system operation during the review period.
    c. Annual Generation Maintenance Schedule for 2024-2029.

3) The proposed heat rate targets must meet all the requirements (qualitative/quantitative) outlined in this Heat Rate Criteria. It should be noted that the target proposals will be fully assessed to ascertain that all Criteria requirements are satisfied.

4) The proposed heat rate targets shall be in accordance with the "reasonable and achievable" condition, and other relevant requirements specified in the Licence. The targets should also be in alignment with the overall objective of system efficiency improvement, and the broad energy efficiency goals of the electricity sector.

NOTE: Specific information requirements and details relating to system reliability that are considered necessary for the regulatory and technical evaluation of the heat rate proposals are outlined in subsequent sections of this Criteria.

Heat Rate Proposals – Requirements and Contents

To facilitate the OUR's comprehensive review of JPS's proposed heat rate and Y-Factor proposals included in the 2024-2029 Rate Review Application, the submissions shall satisfy the following requirements:

1) The 2024-2029 heat rate target proposals shall cover all the requirements and conditions for "heat rate" defined in Schedule 3 of the Licence.

2) Specifically, the heat rate proposals shall include JPS's proposed performance forecast and the proposed Heat Rate targets for each of the five discrete 12-month period of the 2024-2029 Rate Review period, listed above. The heat rate proposals shall also outline the methodology used to develop the proposed targets.

3) The heat rate targets proposals shall be fully justified and substantiated with the relevant supporting schedules/data, heat rate models, heat rate forecasts, fuel price forecast, calculations, documentation, and software simulation files.

OUR's EVALUATION OF JPS' Q-FACTOR TARGETS PROPOSALS

Scope and Objective

The scope and objective of the OUR's evaluation of JPS's heat rate proposals included in the 2024-2029 Rate Review Application, will encompass the following:

1) Initial regulatory review of JPS's 2024-2029 heat rate proposals and supporting schedules within the allowed 10-working day period after the submission date of the 2024-2029 Rate Review Application (Schedule 3 paragraph 7 of the Licence), for adequacy and completeness, and to ascertain whether they meet the requirements of the Criteria and Licence, so as to determine acceptability of the Rate Application.

2) Upon acceptance of JPS's 2024-2029 Rate Review Application by the Office, the OUR will embark on a comprehensive technical evaluation of the 2024-2029 heat rate proposals in accordance with the legal and regulatory requirements, to:

    a. validate whether JPS's heat rate forecast and proposed heat rate targets, meet the "reasonable and achievable" condition, and are consistent with the configuration and operating capability of the electricity system, assumed by the company for the subject review period.

    b. assess JPS's heat rate performance during the 2019-2024 review period. The findings from this review will inform the OUR's determinations on the heat rate targets for the 2024-2029 Rate Review period.

    c. Evaluate/analyze JPS's 2024-2029 heat rate proposals to support the setting of the annual targets, as required by the Licence.

Evaluation Approach

1) The OUR's evaluation of JPS's 2024-2029 heat rate will be based on detailed "technical-economic" and statistical evaluation/analyses, in order to determine heat rate targets for the company that are reasonable and representative, and consistent with the configuration and capability of the electricity system. And also, to provide a reasonable incentive to the company to improve fuel conversion efficiency of the generation system.

2) The OUR's heat rate evaluation proposals will be carried out using the heat rate datasets/schedules, heat rate model, heat rate assessment reports, and software simulation files provided by JPS, and other available system operation data, and with the application of established methods, models, and tools.

3) Generation simulations and analyses will be conducted based on economic generation dispatch principles, taking into consideration credible generation system and transmission network constraints.

Information Requirements for Heat Rate Evaluation

To facilitate the technical evaluation of JPS's 2024-2029 heat rate proposals, the following information and details are required and shall be included in the Rate Review Application:

System Load Data

1) Projected monthly system net generation and peak demand (consistent with the demand forecast in the Final Criteria), for the following periods:
    a. 2024 July – 2025 June
    b. 2025 July – 2026 June
    c. 2026 July – 2027 June
    d. 2027 July – 2028 June
    e. 2028 July – 2029 June
2) The 2023 chronological load data for the system
3) System load factor (LF)

Existing Generation System – JPS and IPPs

1) Status report on the operational status of all generating units interconnected to the System, and the assumed status and capability for the 2024-2029 period.
2) Existing thermal generating plants (JPS and IPPs) technical & operational capabilities:
    a. Output capability – minimum and maximum operating levels (gross and net), dependable capacity, etc.;
    b. Plant efficiency - heat rate curves, average heat rates, incremental heat rate, etc.;
    c. Ramp rates within the specified operating range;
    d. Utilization levels - minimum sustained production level, capacity factor (CF), etc.;
    e. Operating reserves, spinning reserve requirements, constraints on reserves; and
    f. Equivalent availability forced outage rates (FORs), scheduled maintenance days.

    NOTE: This data applies to each individual plant/facility and is required for each month in the base year, with projections for each month in the Rate Review period.
3) Existing Renewable Energy (RE) generation facilities (JPS & IPPs) – installed and contracted capacity, monthly net generation, capacity factor, capacity degradation factor, efficiency, output variability, etc., for each plant/facility – required for each month in the base year, with projections for each month in the Rate Review period.
4) Technical and operational constraints on generating units, including capacity deration (JPS & IPPs plants), assumed to impact system operation during the Rate Review period.
5) JPS generating units Retirement Schedule, as approved by the responsible Minister.
6) The most current Heat Rate Test data/results for JPS thermal plants, which must be in accordance with the requirements of the Generation Code.
7) Variable O&M cost (US$/MWh) for each generating unit/facility in the system – required for each month in the base year, with projections for each month in the Rate Review period,
8) Fuel cost (US$/MWh) for each generating unit/facility in the system - required for each month in the base year, with projections for each month in the Rate Review period. and
9) Any other relevant information relevant to support the heat rate evaluation.

Net Billing Data

1) The aggregate net energy output for all the small-scale generating facilities operating under the Net Billing (SOC) arrangement, for each month in the base year, and projections for each month in the 2024-2029 Rate Review period.

Committed Generation Projects Planned for Commissioning Within Rate Review Period

All relevant information for utility-scale conventional and/or RE generation facilities (centralized and/or DG) scheduled for commissioning within the Rate Review period, which will impact heat rate performance. This information shall include the following, as applicable:

Plant Performance Characteristics (projections for the 5-year review period)

a. Contracted/dependable capacity (MW).
b. Projected monthly and annual net generation (MWh),
c. Contracted heat rate (point) or heat rate curve.
d. Output Capability - minimum and maximum output level.
e. Capacity Factor (monthly and annually).
f. Annual capacity degradation.
g. Equivalent availability, FORs, scheduled maintenance days.

Cost Data (monthly projections for the 5-year review period)

a. Variable O&M costs and indexation.
b. Fuel costs and indexation, as applicable.
c. Start-up costs, as applicable.

Transmission System Data

1) Annual maintenance plan for the Transmission System for each year of the Rate Review period.
2) Planned reinforcement or expansion of the Transmission System during the 2019-2024 Rate Review period.
3) Assumed T&D network constraints and contingencies that may impact the generation dispatch process during the Rate Review period.

Annual Generation Maintenance

1) Annual maintenance schedule for the entire generation system for each year of the 2024 -2029 Rate Review period; and
2) Projections of daily demand, daily available capacity, and daily reserve margin for each year, compiled in MS Excel format.
3) Technical reports on any major maintenance or major overhaul of JPS Thermal Plants carried out in the base year.

Bogue CCGT Heat Rate Calculations with NG/ADO

1) JPS's monthly heat rate calculations for the Bogue CCGT plant when operating on NG and ADO.
2) Supporting schedules to substantiate the calculations must be provided.

Fuel Price Forecast (2024-2029)

1) JPS's fuel price forecast for 2024-2029 covers all the fuel types used for electricity production in thermal generating plants, with fuel prices represented in both US$/MMBTU and US$/Barrel.
2) The fuel price forecast shall take into account the following:
   a. The terms and conditions of the existing Gas Sales Agreements (GSAs).
   b. Henry Hub (HH) Natural Gas (NG) Futures forecast.
   c. The terms and conditions of existing "JPS/Petrojam" and "IPP/Petrojam" Fuel Supply Agreements (FSAs) US Gulf Coast (Platts) Futures for Heavy Fuel Oil (HFO) and Automotive Diesel Oil (ADO).
   d. Transportation cost variations and fuel quality premium.
   e. Government taxes, duties, and fees.

Generation Dispatch

1) Description of JPS's generation dispatch computer simulation model;
2) Full data set of all dispatch assumptions/inputs used in the generation dispatch simulation model, including system constraints, to derive the generation dispatch projections for each month of the Rate Review period;
3) The simulated generation dispatch of all available thermal generating units (JPS & IPPs), for each month of the Rate Review period, as extracted from JPS's generation dispatch software model. To be clear, this generation dispatch data shall be provided in the same file format as the software model.

JPS Heat Rate Model (2024-2029)

1) The MS Excel heat rate model used by the company to develop the 2024-2029 monthly heat rate forecast and the relevant heat rate targets to be applied during the Rate Review period, which shall include, among other things, the following:
   a. Proper quantification of the forecasted input fuel energy (in terms of "volume unit" and "energy unit") to be supplied to each JPS thermal generating unit in each month of the Rate Review period.
   b. The heating value (HHV and LHV) of each fuel type applicable to each JPS thermal generating unit.
   c. The projected net generation (MWh) of each available generating unit (conventional and RE) in the system, for each month in the Rate Review period;
   d. The projected monthly average heat rate (kJ/kWh) for each JPS thermal generating unit derived from the generation dispatch optimization process, for each month in the Rate Review period.
   e. The 2024-2029 monthly average heat rate forecast for JPS's combined thermal generating plants.
   f. The proposed annual (12-month) heat rate targets for 2024-2029 developed based on the selected heat rate methodology (Schedule 3, paragraph 40 of Licence) to be applied monthly in the approved FCAM.
   g. The JPS Heat Rate model must clearly show all calculations and formulas, connecting outputs to inputs.

2) The Heat Rate model must clearly show all calculations and formulas, connecting outputs to inputs.

Heat Rate Evaluation – Results and Findings

The results and findings of the OUR's heat rate evaluation will be factored in the determination of the 2024-2029 heat rate targets. The results, findings and comments emanating from the evaluation will be clearly set out in the tariff determination document.

HEAT RATE METHODOLOGY

1) At the 2014-2019 Rate Review, the OUR's assessment of the "system heat rate" approach that was applicable up to that time, revealed it was creating perverse incentives due to the inclusion of the respective net generation from IPPs' thermal plants and RE generation facilities in the heat rate calculations. As a result, the Office in the 2014-2019 Rate Review Determination Notice discontinued the system heat rate approach and determined that going forward, the applicable heat rate and targets shall be based on JPS' combined thermal generation plants. This approach was considered to be prudent and reasonable and consistent with the existing regulatory requirements.

2) As part of the amendments to the Licence in 2016, this determined heat rate methodology was codified in the Licence . (Schedule 3, paragraph 40).

3) This modification allows for the heat rate (actual and forecast) and targets to be derived based on either a: thermal, system, individual generating plant of JPS, or such other methodology.

4) Notably, since implementation of the 2014-2019 Rate Review Determination Notice in 2015, the thermal heat rate methodology (JPS thermal plants) has remained in effect up to the end of the 2019-2024 Rate Review period.

5) However, the methodology is subject to review during the upcoming 2024-2029 Rate Review process. Accordingly, with the exception of the "System heat Rate" approach (due to the reasons outlined herein), the company is at liberty to propose its preferred heat rate methodology.

6) Notwithstanding, such proposals on heat rate methodology must satisfy the requirements set out in this Criteria.

SENARIO ANALYSIS TO DETERMINE HEAT RATE TARGETS

1) Scenario/sensitivity analysis will be conducted around certain assumptions to test the robustness of the heat rates derived from the evaluation within a given range.

2) Detailed statistical analysis will also be undertaken based on historical and projected heat rate data sets to validate the reasonableness of JPS's proposed heat rate targets.

OUR's DETERMINATION ON JPS HEAT RATE PROPOSALS (2024-2029)

3) After completing its evaluation/analysis of JPS's 2024-2029 heat rate proposals and supporting data, the OUR will determine, among other things, the heat rate calculation methodology, the annual (12-month) heat rate targets and the FCAM, to be used for the monthly adjustment of the fuel rates during the 2024-2029 Rate Review period. In making its determination, the OUR will take into consideration, among other things, following:
    a) The relevant provisions of the Licence;
    b) The results/findings of the OUR's 2024-2029 heat rate evaluation;
    c) The assumed configuration and operating capability of the generation and transmission system for the 2024-2029 Rate Review period;
    d) The heat rate performance during the 2019-2024 review period;
    e) Heat rate improvements made to existing JPS thermal generating units; and
    f) The generation dispatch assumptions/projections for the review period.

4) The OUR's determination will address, among other things, the following aspects:
    a. JPS's historical heat rate performance and the effectiveness of the incentive scheme.
    b. Economic generation dispatch issues.
    c. Generation maintenance issues.
    d. Heat rate tests.
    e. Merit Order and generation dispatch calculations.
    f. Fuel calculation issues.
    g. Fuel management and audits and reporting requirements.
    h. The effect of increased penetration of variable RE generation on heat rate and system efficiency.
    i. IPP generation issues, including forced outages.
    j. Regulatory reporting requirements for heat rate and fuel rate adjustment.