
Office of Utilities Regulation

Jamaica Public Service Company Limited Annual Review 2021

Determination Notice



OFFICE OF UTILITIES REGULATION

2021 September 01

DOCUMENT TITLE AND APPROVAL PAGE

1. DOCUMENT NUMBER: 2021/ELE/010/DET.001

2. DOCUMENT TITLE: Jamaica Public Service Company Limited Annual Review 2021: Determination Notice

3. PURPOSE OF DOCUMENT:

This document sets out the Office's decisions on issues related to the first annual rate adjustment for the Jamaica Public Service Company Limited's Rate Review Period 2019 – 2024, the fourth such under the Revenue Cap regime established pursuant to the Electricity Licence, 2016.

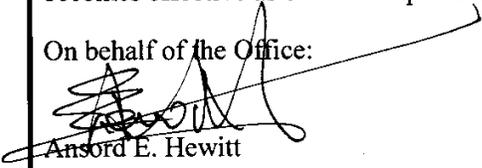
4. ANTECEDENT DOCUMENTS:

2019/ELE/003/RUL.001	Final Criteria – Jamaica Public Service Company Limited: 2019 - 2024 Rate Review Process	2019 March 14
2019/ELE/007/ADM.001	Addendum to Final Criteria – Jamaica Public Service Company Limited: 2019 - 2024 Rate Review Process	2019 April 24
2020/ELE/016/DET.003	Jamaica Public Service Company Limited Rate Review 2019 – 2024: Determination Notice	2020 December 24
2021/ELE/001/ADM.001	Addendum to Jamaica Public Service Company Limited Rate Review 2019 – 2024: Determination Notice	2021 January 29

APPROVAL:

This document is approved by the Office of Utilities Regulation and this Determination becomes effective as of 2021 September 01

On behalf of the Office:


Ansord E. Hewitt
Director - General

2021 September 01

Abstract

On 2021 May 5, Jamaica Public Service Company Limited (JPS) submitted its request to the Office of Utilities Regulation (OUR/Office) for its annual adjustment of rates in accordance with the provisions of the Performance Based Rate-making Mechanism (“PBRM”) outlined in the Electricity Licence, 2016.

This is the first application for rate adjustment following the conclusion of the 2019-2024 Rate Review Process under the new forward-looking revenue cap regime. This document sets out the Office’s decisions on matters contained in JPS’s submission.

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Definitions, Acronyms and Abbreviations

2019-2024 Determination Notice	-	Jamaica Public Service Company Limited Rate Review for Period 2019-2024 Determination Notice, Document No. 2020/ELE/016/DET.003
2019-2024 Rate Review Application	-	Jamaica Public Service Company Limited 2019-2024 Tariff Application
2019-2024 Addendum	-	Addendum to Jamaica Public Service Company Limited Rate Review 2019-2024: Determination Notice

2017 Extraordinary Rate Review Determination	-	Jamaica Public Service Company Limited Extraordinary Rate Review 2017 Determination Notice, Document No. 2017/ELE/001/DET.001
2017 Annual Review & Extraordinary Rate Review (CPLTD) Determination Notice	-	Jamaica Public Service Company Limited Annual Review 2017 & Extraordinary Rate Review – CPLTD: Determination Notice, Document No. 2017/ELE/006/DET.003
ABNF	-	Adjusted Base-rate Non-Fuel
Addendum 1	-	Jamaica Public Service Company Limited Tariff Review for the Period 2014 – 2019: Determination Notice – Addendum 1, Document No. 2015/ELE/003/ADM.001
Annual Review Submission 2017	-	Jamaica Public Service Company Limited Annual Tariff Adjustment Submission for 2017 & Extraordinary Rate Review dated 2017 May 05
CAIDI	-	Customer Average Interruption Duration Index
CCGT	-	Combined Cycle Gas Turbine
CIS	-	Customer Information System
COD	-	Commercial Operations Date
CPLTD	-	Current Portion of Long Term Debt
CPI	-	Consumer Price Index
CRR	-	Community Renewal Rate
CT	-	Current Transformer
dCPI	-	Annual rate of change in non-fuel electricity revenues as defined in exhibit 1 of the Licence
dI	-	The annual growth rate in an inflation and devaluation measure

EEIF	-	Electricity Efficiency Improvement Fund
EGS	-	Electricity Guaranteed Standard
ELS	-	Energy Loss Spectrum
EOS	-	Electricity Overall Standard
ESET	-	The Electricity Sector Enterprise Team
FCAM	-	Fuel Cost Adjustment Mechanism
Final Criteria		
GCT	-	General Consumption Tax
GDP	-	Gross Domestic Product
GNTL	-	Non-technical losses that are not totally within the control of JPS – designated by JPS as general non-technical losses
GoJ	-	Government of Jamaica
GIS	-	Geographic Information System
HB	-	Hunts Bay
HESS	-	Hybrid Energy Storage System
HPS	-	High Pressure Sodium
IAS	-	International Accounting Standards
IFRS	-	International Financial Reporting Standards
IPP	-	Independent Power Producer
IRP	-	Integrated Resource Plan being prepared pursuant to section 7 of the Electricity Act, 2015
JEP	-	Jamaica Energy Partners Limited

JMD	-	Jamaican Dollars
JNTL	-	Non-technical losses that are within JPS's control
JPS/Licensee	-	Jamaica Public Service Company Limited
KVA	-	Kilo Volt Amperes
KWh	-	Kilowatt-hours
Licence 2016	-	The Electricity Licence, 2016
LED	-	Light-emitting Diode
MAIFI	-	Momentary Average Interruption Frequency Index
MED	-	Major Event Day/s
MSET	-	Ministry of Science Energy and Technology
MV	-	Mercury Vapour
MVA	-	Mega Volt Amperes
MW	-	Megawatt
MWh	-	Megawatt-hours
NBV	-	Net Book Value
NFE	-	New Fortress Energy
NPV	-	Net Present Value
NTL	-	Non-technical losses
O&M	-	Operating and Maintenance
OCC	-	Opportunity Cost of Capital
Office/OUR	-	Office of Utilities Regulation

OH	-	Old Harbour
OUR/Office	-	The Office of Utilities Regulation
OUR Act	-	The Office of Utilities Regulation Act
PATH	-	Programme of Advancement Through Health and Education
PAYG	-	Pay As You Go
PBRM	-	Performance Based Rate-Making Mechanism
PCI	-	Non-fuel Electricity Pricing Index
PPA	-	Power Purchase Agreement
RE	-	Renewable Energy
ROFR	-	JPS's Right of First Refusal exercisable in accordance with the Electricity Act, 2015
SAIDI	-	System Average Interruption Duration Index
SAIFI	-	System Average Interruption Frequency Index
SBF	-	System Benefit Fund
SJPC	-	South Jamaica Power Company Limited
SSP	-	Smart Streetlight Programme
System	-	Refers to the physically connected generation, transmission and distribution network of JPS
T&D	-	Transmission & Distribution
TFP	-	Total Factor Productivity
TL	-	Technical Losses
TOU	-	Time of Use

USD	-	United States Dollars
WKPP	-	West Kingston Power Plant
WT	-	Wholesale Tariff
YTD	-	Year to date

1 Executive Summary

1.1 The JPS's Annual Review Proposal

1.1.1 JPS in its 2021 Annual Review submission to the Office of Utilities Regulation (hereinafter referred to as the OUR or the Office), among other things, requested the following:

- An average increase of 3.5% on customers' total bill (non-fuel and fuel)
- A Z-Factor adjustment of 8.51% to the 2021 Annual Revenue Cap
- An overall increase of 27.02% in the 2021 Annual Revenue Cap

1.2 The Analysis of the Proposal

1.2.1 The OUR's review of the components of the Performance Based Rate-making Mechanism (PBRM) has revealed the following:

- JPS proposed a Growth Rate in Inflation/Exch. Rate (*dI*) factor of 18.51%, which was computed using 2018 March Consumer Price Indices (CPI) data as base indices instead of data as at 2019 March. However, based on the 2019 March timeline on which the tariff was constructed, the OUR approved a Growth Rate of 16.16%.
- JPS proposed a Q-Factor adjustment of 0%. The OUR's assessment of JPS's quality of service performance over 2020 was in alignment with the company's proposed indices. Consequently, the proposed 0% Q-Factor adjustment was approved;
- With respect to the Z-Factor, JPS proposed an adjustment of 8.51%. Based on the OUR's evaluation, approval was given for a 3.11% adjustment. The 3.11% adjustment was derived from:
 - A 4.09% Revenue Gap adjustment for 2020. JPS's proposal was for an adjustment of 8.51%.
 - A -0.98% adjustment for delays and shortfalls in the implementation of the approved 2020 Capital Investment Plan. JPS had requested zero adjustment for the 2020, citing, among other things, the challenges of Covid-19 and the late approval of the 2019-2024 tariff.
- All relevant factors considered, the OUR approved a Rate of Change (dPCI) of 19.27% to the 2021 Revenue Cap versus the 27.02% proposed by JPS. See Table 1.1 below for details.

Table 1.1 - Growth Rate in Inflation & F/X (dI) and Rate of Change of the Revenue Cap (dPCI)

Description		Value	
JPS Proposed	OUR Approved	JPS Proposed	OUR Approved
Base Exchange Rate	Base Exchange Rate	128.00	128.00
Adjusted Billing Exchange Rate	Adjusted Billing Exchange Rate	145.00	145.00
<u>Jamaican Inflation Index</u>		<u>Jamaican Inflation Index</u>	
CPI @ March 2021	CPI @ March 2021	108.30	108.30
CPI @ March 2018	CPI @ March 2019	95.00	98.20
<u>US Inflation Index</u>		<u>US Inflation Index</u>	
CPI @ March 2021	CPI @ March 2021	264.88	264.88
CPI @ March 2018	CPI @ March 2019	248.55	254.20
Exchange Rate Factor	Exchange Rate Factor	13.28%	13.28%
Jamaican Inflation Factor	Jamaican Inflation Factor	14.00%	10.29%
US Inflation Factor	US Inflation Factor	6.14%	4.20%
The Growth Rate (dI)	The Growth Rate (dI)	18.51%	16.16%
Q Factor	Q Factor	0.00%	0.00%
Z Factor	Z Factor	8.51%	3.11%
The Rate of Change of the Revenue Cap (dPCI)	The Rate of Change of the Revenue Cap (dPCI)	27.02%	19.27%

1.2.2 The OUR's review of the revenue true-up calculations revealed significant variances between JPS's proposed values and those approved. The largest variance was observed for the foreign exchange (FX) surcharge. JPS proposed the amount of J\$1.98B whereas the amount approved by the OUR is J\$731.3M. The total amount approved for the 2020 Revenue True-Up is an off-set of J\$572.68M. JPS proposed an addition of J\$1.04B. See Table 1.2 below for details.

Table 1.2 - Revenue True-Up – JPS's Proposed and OUR's Approved Values

2020 Revenue True-Up		
Parameters	JPS Proposed (J\$M)	OUR Approved (J\$M)
FX Surcharge (SFX ₂₀₂₀)	1,977.80	731.27
Interest Surcharge (SIC ₂₀₂₀)	(271.00)	(354.44)
Volumetric (TUVol ₂₀₂₀)	(38.20)	(38.16)
System Losses (TULos ₂₀₂₀)	(735.20)	(850.60)
WACC	110.80	(60.76)
Total	1,044.20	(572.68)

1.3 Z-Factor Adjustments

1.3.1 Having reviewed JPS's proposal for the recovery of a 2020 Revenue Gap, the Office approved the following adjustments:

- A 2020 Revenue Gap of J\$1.548B (JPS proposed J\$2.879B)
- A 2020 Revenue Gap opportunity cost of J\$164.2M (JPS proposed J\$341.8M)
- An adjustment to the revenue requirement in relation to Capital Project delays of J\$370.7M inclusive of opportunity cost of J\$39.3 million (JPS proposed that no adjustments be made)
- A total Z-Factor adjustment of 3.11% (JPS proposed 8.51%)

1.4 System Losses Performance and Y-Factor Adjustment

1.4.1 Having reviewed the JPS's System Losses performance and Y-Factor proposal, the Office determined the following:

1. The 2020 Y-Factor applicable to the 2021 Annual Revenue Target adjustment is - 2.06%.
2. JPS's proposed revision of the Office's determined 2021 System Losses targets is not approved
3. JPS shall submit a "detailed report" to the Office, covering the "Smart Meter Programme" implementation activities up to 2021 June, with the contents stipulated in Chapter 14 (paragraph 14.184) of the 2019-2024 Determination Notice, within three (3) months of the effective date of this Determination Notice.
4. JPS shall submit a detailed report on the implementation status of JPS/CB 10MW CHP DG project to the Office, within one (1) month of the effective date of this Determination Notice.
5. JPS shall comply with all System Losses related requirements specified in this Determination Notice.

1.4.2 The OUR has assessed JPS's proposed heat rate target of 9,927kJ/kWh and concluded as follows:

1. JPS's proposed Heat Rate target (revised - 9,927 kJ/kWh) for the 2021-2022 rate adjustment period was deemed unrepresentative, and not consistent with optimal economic generation dispatch.
2. The pre-established Heat Rate target in the 2019-2024 Determination Notice of 9,667 kJ/kWh, shall be applicable for the 2021-2022 rate adjustment period.
3. The Heat Rate methodology based on JPS's thermal generating plants shall continue to be applied for the H-Factor and FCAM for the 2019-2024 Rate Review period.
4. After the effective date of this Annual Review Determination Notice, the H-Factor adjustment shall commence with JPS's fuel cost for the preceding calendar month.

Table 1.3 - Comparative Results

Comparative Results		
Description	JPS Proposed (J\$M)	OUR Approved (J\$M)
Approved Revenue Cap	37,857	37,857
Annual Rate of Change	27.02%	19.27%
Adjusted Revenue Cap	48,086	45,152
2020 Revenue True-Up (incl.WACC)	1,044	(573)
2021 Annual Revenue Target	49,130	44,579
Heat Rate Target (kJ/kWh)	9,927	9,667
Overall Bill Impact (incl.fuel and IPP charges):	3.5%	1.4%
Residential Customers (RT10)	Upward of 3.8%	Average 1.2%
Small Commercial Customers (RT20)	2.2%	Average 1.1%
Large Commercial Customers LV (RT40)	3% - 4%	Average 1.5%
Large Commercial Customers HV (RT50)	3% - 4%	Average 1.4%
Large Commercial Customers HV Standard (RT70)	4.30%	Average 1.6%

1.5 Other Regulatory Matters

Z-Factor Adjustment for ROE Catch-Up

1.5.1 Having reviewed JPS’s proposal for the ROE computation, the Office has accepted that the ROE should be used to adjust return on investments outside of the -3 percentage point/ + 1% percentage point band. Additionally, the OUR has proposed that:

1. In its computation, JPS should use the nominal values for the approved return on equity, consistent with those set out in the JPS’s Rate Review 2019-2024 Determination Notice.
2. JPS shall take into consideration the allowed true-up annual adjustments, special purposed funds included in the Revenue Requirement, awards of the Tribunal and determinations of the Office and adjustments related to prior accounting periods, and shall account for the amounts attributed to the following adjustment items:
 - Payments for Breaches to Guaranteed Standards
 - System Losses Adjustment (TULos)
 - Fuel Charge Adjustment for Gain/(Loss) from application of the Y-Factor

Transition of Net Billing Customers to Time-of-Use

1.5.2 The decision to shift all Net-billing customers to the TOU category shall remain unchanged.

RT10 & RT20 TOU Rate Design

- 1.5.3 The OUR has approved revised TOU rates for the RT10 and RT20 categories. JPS shall roll out its TOU programme over the 6-month period after the effective date of this Determination Notice. During the transition period leading up to the transfer, JPS shall engage customers in a well-structured education/promotion programme concerning the nature of TOU rates.
- 1.5.4 JPS shall be required to keep detailed information on the demand (KW/KVA), consumption (kWh), load curve and bill payment of customers before and after taking the option to facilitate further refinement of the design.

Prepaid IPP Decoupling

- 1.5.5 The Office approves JPS's Request for the decoupling of Independent Power Producers' (IPP') Charges from residential and small commercial prepaid rates. This is in keeping with the approval in JPS's Rate Review 2019-2024 Determination Notice for the separation of IPP charges from all JPS's non-fuel charges. In this regard, prepaid customers should see a separate line item representing the IPP charge on their bills.
- 1.5.6 The approved non-fuel pre-paid rates for RT10 customers are as follows:
- (i) J\$13.85/kWh for the first 117kWh within a thirty (30)-day consumption cycle.
 - (ii) J\$21.03/kWh for each additional kWh thereafter within that thirty (30)-day consumption cycle.
 - The IPP rate shall be displayed as a separate line item on the customer bill.
 - The prepaid rates will be reviewed at the next Annual Rate Review.
- 1.5.7 The approved non-fuel pre-paid rate when compared with the post-paid rate shall be revenue-neutral for services to Rate 20 customers. The prepaid rates are as follows:
- (i) First 10kWh J\$122.45/kWh
 - (ii) Each additional kWh J\$9.03/kWh
- The IPP rate shall be displayed as a separate line item on the customer bill.
 - The pre-paid rates will be reviewed at the next Annual Rate Review.

Electric Vehicles

- 1.5.8 The decision established in the 2019-2024 Determination Notice for Electric Vehicle (EV) rates at public charging facilities stands. The energy charge shall be equivalent to the RT10 TOU rates plus 5%.

Overall Increase

1.5.9 As shown in Table 1.3 (earlier) the overall bill impact of the rate adjustment is an increase of 1.4%. The Schedule of the 2021 Non-Fuel Rate is displayed in Table 1.4 below.

**Table 1.4 - The 2021 Non-Fuel Rate Schedule
(Base Exchange rate J\$145.00: US\$1.00)**

Rate Category	Blocks	Customer Charge (J\$/Month)	Energy Charge (J\$/kWh)				Demand Charge (J\$/kVA)				Tariff Adjustment (J\$/kWh)
			STD	Peak	Partial Peak	Off Peak	STD	Peak	Partial Peak	Off Peak	
Rate 10 STD	0 - 100	531.93	7.32								-0.113
	> 100	531.93	21.03								-0.113
Rate 10 Pre-Paid	0 - 117		13.85								-0.113
	> 117		21.03								-0.113
Rate 10 TOU	0 - 300 kWh	532.16		56.17	11.35	8.75					-0.113
	300 - 500 kWh	810.46									
	500 - 800 kWh	2,050.16									
	>800kWh	3,568.16									
Rate 20 STD		1,134.20	9.03								-0.113
Rate 20 Pre-Paid	0 - 10		122.45								-0.113
	> 10		9.03								-0.113
Rate 20 TOU		1,465.61		33.90	6.72	3.18					-0.113
Rate 40 STD		7,990.99	6.09				2,737.13				-0.113
Rate 40 TOU		7,990.99		5.87	5.25	5.12		1,526.68	1,126.73	327.05	-0.113
Rate 50 STD		7,990.99	4.32				1,896.55				-0.113
Rate 50 TOU		7,990.99		4.87	4.36	4.25		1,177.23	872.34	311.27	-0.113
Rate 60 Streetlight		3,222.17	12.39								-0.113
Rate 60 Traffic Signal		3,222.17	11.95								-0.113
Rate 70 STD		7,990.99	4.31				2,513.67				-0.113
Rate 70 TOU		7,990.99		5.31	4.75	4.63		1,333.86	870.58	312.50	-0.113
Electric Vehicles		-		58.98	11.92	9.19					

2 Summary of JPS's Annual Review Submission

2.1 Introduction

2.1.1. On 2021 May 5, by way of a letter dated 2021 May 4, the Jamaica Public Service Company Limited (JPS) applied for its Annual Review of rates pursuant to Schedule 3 of the Licence, 2016. The company's application, among other things, outlined proposals for the parameters to be used in the Performance-Based Rate-Making Mechanism (PBRM).

2.2 2021 Annual Revenue Target (ART₂₀₂₁)

2.2.1. The company requested a 2021 Annual Revenue Target (ART₂₀₂₁) of \$49,130M. As shown in Table 2.1 below, \$3,222M of the ART₂₀₂₁ amount was derived from a Z-Factor adjustment for shortfall in the 2020 revenues.

Table 2.1 – JPS's Proposed 2021 Annual Tariff Adjustment Summary

JPS Proposed 2021 Annual Tariff Adjustment Summary	
Item	Amount (J\$'M)
Revenue Cap 2021	37,857
dI Adjustment (18.51%)	7,008
Revenue Cap 2021 (Adjustment for Growth -dI)	44,864
Q-Factor (0%)	-
Z-Factor Adjustments	
2020 Revenue Gap	3,222
RC2021 * (1 + dPCI) 27.02%	48,086
Performance Adjustments	
Revenue Surcharge - RS ₂₀₂₀	(773)
FX Surcharge - FX ₂₀₂₀	1,978
Interest Surcharge - SIC ₂₀₂₀	(271)
WACC	11.87%
2020 Adjustments - (RS₂₀₂₀+FX₂₀₂₀-SIC₂₀₂₀) *(1+WACC)	1,044
2021 Annual Revenue Target -ART₂₀₂₁	49,130

Adjusted Revenue Cap

2.2.2. JPS requested 27.02% as the applicable rate of change (dPCI) for adjusting the approved 2021 Revenue Cap (RC₂₀₂₁).

2.2.3. JPS's derived rate of change (dPCI) comprised an annual growth rate (dI) factor of 18.51% and a Z-Factor adjustment of 8.51%. JPS proposed that its Q-factor adjustment be set at 0% based on its performance relative to the set 2020 targets which JPS stated were impacted by the COVID-19 virus and tropical storms Laura, Zeta and Eta.

- 2.2.4. The annual growth rate (dI) represents the changes in the value of the JMD against the USD and the inflation in the cost of providing electricity products and services. The dI is derived by computing the respective Jamaican and United States inflation rates, along with the change in the JMD to USD exchange rate to determine the inflation and foreign exchange adjustment factors respectively. JPS proposed that 18.51% should be the aggregated inflation and foreign exchange adjustment factor applicable for the annual growth rate.
- 2.2.5. JPS proposed a Z-factor adjustment within the category of an allowed rate of price adjustment for special reasons not under the control of JPS and not captured by other elements of the formulae for the adjustment mechanism. JPS proposed an 8.51% Z-factor adjustment representing the shortfall in 2020 revenues of \$3,222M due to a delay in the implementation of the approved tariffs.
- 2.2.6. Given JPS's proposed dPCI of 27.02%, the approved real revenue cap (RC2021) of \$37,857M as stated in the 2019 – 2024 Determination Notice, JPS adjusted the real revenue cap upwards, which resulted in a proposed actual 2021 revenue cap (Adjusted RC2021) of \$48,086M.

Revenue True-Up

- 2.2.7. JPS's revenue true-up has three components: (1) the revenue surcharge that is comprised of true-up for volumetric adjustments and system losses; (2) the FX surcharge, which is a true-up for FX gains/losses; and (3) the net interest surcharge, which is a true-up of net interest/ (income) and late-payment penalties levied on customers. These true-ups reconciled JPS's actual performance during 2020 against the targets set for that year. Based on its performance during 2020, JPS proposed the following surcharge adjustments for 2021:
- Revenue Surcharge (RS₂₀₂₀) : -\$773,364,392 (reduction)
 - Volume adjustment true-up (TUVol₂₀₂₀) : -\$38,159,806
 - System losses adjustment true-up (TULos₂₀₂₀): -\$735,204,586
 - FX Surcharge (FX₂₀₂₀): \$1,977,806,476 (increase)
 - Annual Net Interest Surcharge (SIC₂₀₂₀): -\$271,031,524 (reduction)
- 2.2.8. JPS's proposed total revenue true-up derived from computing the three (3) surcharge components is \$933,410,560. However, the application of the pre-tax WACC of 11.87% to account for the opportunity cost of the revenue surcharge resulted in a proposed upward adjustment of the revenue cap by \$1,044,206,394.
- 2.2.9. Notwithstanding JPS's submission of a negative TULos true-up from the 2020 performance, the company argued that it believes the target true-up for System Losses should not be applicable to this Annual Review, as the targets would have been retroactively applied to its performance. JPS further stated that if the System losses true-up (TULos) is not applied, it would result in an ART₂₀₂₁ of \$49,953M instead of the \$49,130M proposed.

2.3 Proposed 2021 Tariff Basket and Rates

2.3.1. Based on the proposed ART₂₀₂₁, JPS stated that an overall non-fuel tariff adjustment of 12.3% would be required. The company further explained that the 12.3% increase on non-fuel tariff would have an impact of approximately 3.5% increase on customers' total bill.

2.3.2. Table 2.2 below shows a breakdown of revenues per customer category required to recover the proposed ART₂₀₂₁. The respective proposed tariffs for achieving these revenues are shown in Table 2.3.

Table 2.2 - JPS's Proposed 2021 Revenue Basket

Class	Voltage Level	Block	Customer Charge	Energy	Demand	Total Revenue
			(\$)	(\$)	(\$)	(\$)
Rate 10	LV	≤100	4,396,372,704	4,565,276,310	-	8,961,649,014
Rate 10	LV	>100	-	13,918,944,338	-	13,918,944,338
Rate 20	LV		1,067,193,203	5,649,610,776	-	6,716,803,979
Rate 40-STD	LV		190,778,539	4,331,988,946	6,968,756,116	11,491,523,601
Rate 40-TOU	LV		11,923,659	649,560,448	861,735,127	1,523,219,233
Rate 50-STD	MV		13,538,133	907,226,347	1,424,930,085	2,345,694,566
Rate 50-TOU	MV		2,489,357	205,761,664	383,743,988	591,995,009
Rate 70-STD	MV		2,263,872	929,520,011	2,222,353,329	3,154,137,212
Rate 70-TOU	MV		396,854	186,563,406	320,241,336	507,201,596
Rate 60-S	LV		7,797,423	712,446,524	-	720,243,947
Rate 60-T	LV		13,172,699	8,187,623	-	21,360,322
TOTAL			5,705,926,441	32,065,086,393	12,181,759,980	49,952,772,815

Table 2.3 - JPS's Proposed 2021 Non-Fuel Tariffs

Class	Voltage Level	Block	Customer Charge	Energy Charge-J\$/kWh				Demand Charge-J\$/kVA			
				Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak
			(\$)								
Rate 10	LV	≤100	593.76	8.16	-	-	-	-	-	-	-
Rate 10	LV	>100	593.76	23.49	-	-	-	-	-	-	-
Rate 20	LV		1,273.43	10.08	-	-	-	-	-	-	-
Rate 40-STD	LV		8,903.64	6.64	-	-	-	3,037.11	-	-	-
Rate 40-TOU	LV		8,903.64	-	5.61	5.72	6.29	-	387.75	1,246.55	1,675.24
Rate 50-STD	MV		8,903.64	4.67	-	-	-	2,094.49	-	-	-
Rate 50-TOU	MV		8,903.64	-	4.74	5.50	2.57	-	357.43	982.72	1,291.14
Rate 70-STD	MV		8,903.64	4.55	-	-	-	2,623.28	-	-	-
Rate 70-TOU	MV		8,903.64	-	4.08	4.20	4.68	-	340.23	888.95	1,363.45
Rate 60-S	LV		3,464.51	14.59	-	-	-	-	-	-	-
Rate 60-T	LV		3,464.51	14.07	-	-	-	-	-	-	-

2.4 Quality of Service (Q-Factor)

2.4.1. The Q-Factor is the allowed price adjustment to reflect changes in the quality of service provided to customers versus the target for the prior year. JPS stated that its 2020 reliability performance resulted in zero points being awarded and consequently a 0% Q-Factor adjustment.

- 2.4.2. Despite JPS's proposal of a 0% adjustment for the Q-Factor, the company stated that there should be no retroactive target setting, as the 2019-2024 Determination Notice was published by the OUR on 2020 December 24, and the setting of retroactive targets is not provided for in the Licence 2016 nor is it a prudent regulatory practice.
- 2.4.3. JPS also indicated in its submission that it is seeking clarification from the OUR on the completeness of the OUR's methodology in arriving at the established Q-Factor baseline from the statistical data presented.
- 2.4.4. Additionally, the company posited that the definition of "Major System Failure" be aligned to international utility best practices where "at least 100,000 customers or approximately 15% of the customer base is affected."

2.5 Z-Factor Adjustment Requests

- 2.5.1. As previously mentioned, the utility company requested a Z-Factor adjustment in the amount of \$3,222M for a shortfall in revenues for 2020. The amount would translate to an 8.51% adjustment factor.
- 2.5.2. Additionally, JPS proposed that the ROE, and not WACC, be used as the reference indicator for determining the company's eligibility for Z-Factor adjustment in relation to the -3 percentage points/+1 percentage point profitability range specified in Schedule 3, paragraph 46 of the Licence 2016.
- 2.5.3. JPS proposed that due to a delay in the approval of the company's Capital Investment Plan, no Z-Factor adjustment should be made for the Capital Investment Plan. JPS also indicated that it was not claiming for costs related to projects for which the approved 2020 budget was overspent. The company stated that its position is based on the following:
- JPS would have no knowledge of the final approved budget and scope of the projects before 2020 December;
 - the COVID-19 pandemic disrupted the global supply chain leading to significant limitations to JPS's ability to implement projects in a timely manner;
 - JPS was not able to benefit from the intended cash flow because of the late approval of the new tariffs.

2.6 System Losses (Y-Factor)

- 2.6.1. Table 2.4 shows the targets for the losses spectrum proposed by JPS.

Table 2.4 – JPS’s Proposed System Losses Targets

System Loss Component	Target(%)
<i>Technical loss</i>	<i>7.90</i>
<i>Non-technical loss fully within the control of JPS</i>	<i>6.61</i>
<i>Non-technical loss not fully within the control of JPS</i>	<i>12.90</i>
Total	27.41%

2.7 Heat Rate (H-Factor)

2.7.1. After outlining a number of issues that affected the company’s thermal efficiency performance, JPS proposed that the 2021 July – 2022 June thermal heat rate target be revised from 9,667kJ/kWh outlined in the 2019-2024 Determination Notice to 9,927kJ/kWh. The company stated that it envisaged a difficulty in achieving the approved target over the 2021/2022 period for the reasons outlined below and proffered the view that the OUR should have considered the following factors in setting the target:

- a) The effects of the current pandemic on the load demand;
- b) The 40 days’ planned outage of JPS’s most efficient unit (Bogue ST14); and
- c) The Rockfort units heat rate deterioration.

2.8 Other Proposals

- 2.8.1. JPS argued that there was the need for a thorough review of the approved TOU rates in order to prevent revenue leakages. As such, the company requested that the OUR defers the implementation of the TOU rate.
- 2.8.2. JPS did not submit a revised DER tariff proposal in its 2021 Annual Review Application. However, the company indicated an intention to make a submission in 2021 August. Additionally, the company argued that the existing Standby rate does not adhere to key rate setting principles with specific emphasis on cost-reflectivity and proposed that, in the interim, the Non-Firm Standby category be omitted from the Rate Schedules.
- 2.8.3. In its 2019-2024 Rate Review Application JPS had proposed a change in the structure of its streetlight tariff. In essence, the company requested “a modification of the RT60 Street light tariff to include a monthly customer charge per fixture.” This proposal was resubmitted in the 2021 Annual Review.

3 Legal Framework

- 3.1. The Office of Utilities Regulation (throughout this document referred to as the Office or the OUR) is a multi-sector regulator established pursuant to the Office of Utilities Regulation Act, (the “OUR Act”), to regulate the provision of prescribed utility services in Jamaica. Under Section 4(1)(a) of the OUR Act, the Office has regulatory authority over, inter alia, the generation, transmission, distribution and supply of electricity.
- 3.2. JPS, which has exclusive rights for the transmission, distribution and the supply of electricity in Jamaica, is regulated by the Office pursuant to the provisions of the OUR Act, the Electricity Act, 2015 and the Licence 2016 which is published in the Jamaica Gazette Vol. CXXXIX No. 6A dated 2016 January 27.
- 3.3. Section 4(d) of the Electricity Act, 2015 states that “*the Office shall regulate the electricity sector generally.*”
- 3.4. This Determination Notice is being issued pursuant to Sections 4(4), 4(4A), 11 and 12 of the OUR Act and Condition 15, Schedule 3 and Exhibit 1 of the Licence 2016.
- 3.5. Sections 4(4), 4(4A), 11 and 12 of the OUR Act, provide in part as follows:

4. Functions of the Office

“(4) The Office shall have the 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;*

and in determining the appropriate rate of return on investment required to satisfy the interests of persons investing in Jamaica, the opinion of the Bank of Jamaica shall be obtained by way of guidance, which opinion shall take into account relevant market benchmarks and provide an assessment of the appropriate country risk premium; and

...

(b) take into account –

- (i) the interest of consumers in respect of matters, including the cost, safety and quality of the services;*
- (ii) Jamaica’s economic development;*
- (iii) the best use of indigenous resources;*

- (iv) *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*
- (v) *the possibility of including special tariffs for special economic zones, and wholesale rates for large consumers, to enhance their competitiveness and Jamaica's economic development."*

11. Power to fix rates

"11. (1) Subject to subsection (3), the Office may, either of its own motion or upon application made by a licensee or specified organization (whether pursuant to subsection (1) of section 12 or not) or by any person, by order published in the Gazette prescribe the rates or fares to be charged by a licensee or specified organization in respect of its prescribed utility services.

(2) For the purposes of this section, the Office may conduct such negotiations as it considers desirable with a licensee or specified organization, industrial, commercial or consumer interest, representatives of the Government and such other persons and organizations as the Office thinks fit.

(3) The provisions of subsection (1) and (2) shall not apply in any case where an enabling instrument specifies the manner in which rates may be fixed by a licensee or specified organization."

12. Application by approved organization to fix rates

"12. (1) Subject to subsection (2), an application may be made to the Office by a licensee or specified organization by way of a proposed tariff specifying the rates or fares which the licensee or specified organization proposes should be charged in respect of its prescribed utility services and the date (not being earlier than the expiration of thirty days after the making of the application) on which it is proposed that such rates should come into effect (hereinafter referred to as the specified date).

(2) ...

(3) Where an application by way of a proposed tariff is made under subsection (1) notice of such application and, if so required by the Office, a copy of such tariff, shall be published in the Gazette and in such other manner as the Office may require.

(4) A notice under subsection (3) shall specify the time (not being less than fourteen days after the publication of the notice in the Gazette) within which objections may be made to the Office in respect of the proposed tariff to which the notice relates.

(5) Subject to provisions of this Act, the Office may, after expiration of the time specified in the notice under subsection (3), make an order either-

(a) confirming the proposed tariff without modifications or with such modifications as may be specified in the order; or

(b) rejecting the proposed tariff.

(6) If, after publication of the notice of an application in accordance with subsection (3), no order under subsection (5) has been made prior to the specified date, the proposed tariff shall come into force on the specified date.

(7) An order confirming a proposed tariff shall not bring into operation any rates or fares on a date prior to the date of such order.”

3.6. Pursuant to Condition 2, paragraphs (2) and (3) of the Licence 2016 provide:

“(2) The Licensee is hereby granted the Licence, right and privilege (hereinafter called “this Licence”) to generate, transmit, distribute and supply electricity to all parts of the Island of Jamaica, subject however, to the provisions of this Licence and to regulation as herein provided.

(3) Subject to the provisions of this Licence the Licensee shall provide an adequate safe and efficient service based on modern standards, to all parts of the Island of Jamaica at reasonable rates so as to meet the demands of the island and to contribute to economic development.”

3.7. Condition 15, paragraphs 1 and 2 of the Licence 2016 provide:

“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 to the supply of electricity shall be subject to such limitation as may be imposed from time to time by the Office.”

3.8. Schedule 3 of the Licence 2016 outlines the Revenue Cap principle as follows:

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

3.9. Schedule 3, paragraphs 1-5 of the Licence 2016 entitled “Rates” provide as follows:

“1. The rates shall be charged to customers in accordance with the rate classes approved by the Office.

2. The rates are comprised of the following:

- (a) Non-fuel rate; and*
- (b) Fuel rate.*

3. The fuel rate shall be adjusted by the Office monthly in accordance with the Fuel Cost Adjustment Mechanism.

4. The non-fuel rate shall be reviewed by the Office:

- (a) In rate reviews that are customarily done every five years;*
- (b) In extra-ordinary rate reviews which may be conducted in between rate reviews; and*

(c) *Annually under the Performance Based Rate-Making Mechanism (“PBRM”) adjustment.*

(d) *All rates shall be determined by the Office.”*

3.10. Schedule, 3, paragraphs 42 to 46 of the Licence 2016 entitled “Annual Review” , provide as follows:

*“42. The methodology to be utilised by the Office in computing the PBRM is set out in detail in **Exhibit 1**.*

43. The Licensee shall make annual filings to the Office at least sixty (60) days prior to the Adjustment Date. These filings shall include the support for the performance indices, the inflation, and the proposed non-fuel rates for electricity and other information as may be necessary to support such filings.

44. These filings shall also propose the non-fuel rates scheduled to take effect on the Adjustment Date for each of the rate categories. These rates shall be set to recover the annual revenue requirement for the same year in which the proposed rates take effect, given the target billing determinants.

45. The target billing determinants shall be based on the actual billing determinants for the immediately preceding calendar year. The Office is empowered to adjust the target billing determinants for known and measurable changes anticipated in relation to the following year.

46. The Office shall apply the following adjustment factors to the non-fuel rate at each PBRM:

*a. The **Q-Factor**, which 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 5-year rate review determination.*

*b. The **H-Factor**, if applicable, will reflect the heat rate as defined by the Office of the power generated in Jamaica versus a pre-established yearly target in the 5 year rate setting determination by the Office.*

*c. The **Y-Factor** reflects the achieved results versus the long-term overall system losses target.*

*d. The **Z-Factor** reflects the 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 following special circumstances:*

(i) Any special circumstances that satisfy all of the following:

a) affect the Licensee’s costs or the recovery of such costs, including asset impairment adjustments;

b) are not due to the Licensee’s managerial decisions;

*c) have an aggregate impact on the Licensed Business of more than \$50 million in any given year; and
d) are not captured by the other elements of the revenue cap mechanism;*

(ii) where the Licensee's rate of return with respect to the Licensed Business is one (1) percentage point higher or three (3) percentage points lower than the approved regulatory target (after taking into consideration the allowed true-up annual adjustments, special purpose funds included in the Revenue Requirement, awards of the Tribunal and determinations of the Office and adjustments related to prior accounting periods). This adjustment may be requested by the Licensee or the Minister or may be applied by the Office;

(iii) 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;

(iv) Government Imposed Actions;

*(v) where the Licensee demonstrates and the Office agrees that an extraordinary 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);
or*

(vi) where the Licensee is required to make a change to the Guaranteed Standards in Condition 17(5) and such change will have a financial impact on the Licensee in an amount greater than Fifty Million Jamaican dollars (J\$50,000,000.00) during any rate review period."

- 3.11. Schedule 3, paragraphs 49 – 54 of the Licence 2016, inter alia, gives JPS the right to charge late payment interest to GoJ and customers, other than residential customers, who do not pay their bills in full by the due date. With respect to residential customers, the Licence 2016 prohibits the charging of interest on overdue balances, but maintains JPS's right to charge a late payment fee and offer an early payment incentive fee, for payments made on time and in full by the due date.
- 3.12. Schedule 3, Exhibit 1 of the Licence 2016 entitled "Performance Based Rate-making Mechanism", provides as follows:

"Annual Adjustment of the Annual Revenue Target

The Annual Revenue target shall be adjusted on an annual basis, commencing July 1, 2016, (Adjustment Date), pursuant to the following formulae:

$$ART_y = RC_y(1 + (di + Q \pm Z)) + (RS_{y-1} + SFX_{y-1} - SIC_{y-1}) * (1 + WACC)$$

where:

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

$$SFX_{y-1} = AFX_{y-1} - TFX$$

$$SIC_{y-1} = AIC_{y-1} - TIC$$

And

ART_y = Annual Revenue Target for Year “y”

RC_y = Revenue Cap for the current tariff adjustment year “y” as established in the last Rate Review Process

RS_{y-1} = Revenue surcharge for Year “y-1”

$$TUVol_{y-1} = \left\{ \frac{kWh \text{ Target}_{y-1} - kWh \text{ Sold}_{y-1}}{kWh \text{ Target}_{y-1}} \right\} X \text{ Non Fuel Rev Target for Energy } REV_{y-1}$$

$$+ \left\{ \frac{KVA \text{ Target}_{y-1} - KVA \text{ Sold}_{y-1}}{KVA \text{ Target}_{y-1}} \right\} X \text{ Non Fuel Rev Target for Demand } REV_{y-1}$$

$$+ \left\{ \frac{\# \text{ of Customer Charges Billed Target}_{y-1} - \# \text{ of Customer Charges Billed Act.}_{y-1}}{\# \text{ of Customer Charges Billed Target}_{y-1}} \right\} X \text{ Non Fuel Rev}$$

Target for Customer Charges REV_{y-1}

Given that all tariffs charged to customers can be broadly allocated to three primary revenue buckets, namely, Energy, Demand and Customer Charge, the true-up mechanism will be operated on that basis. The revenue target for each year will be allocated to each bucket with the target quantities estimated to achieve each revenue bucket forming the basis for the true-up adjustment for each revenue bucket as outlined in the formulae above.

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

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

$$Ya_{y-1} = \text{Target System Loss “a” Rate}\%_{y-1} - \text{Actual System Loss “a” Rate}\%_{y-1}$$

$$Yb_{y-1} = \text{Target System Loss “b” Rate}\%_{y-1} - \text{Actual System Loss “b” Rate}\%_{y-1}$$

$$Yc_{y-1} = \text{Target System Loss “c” Rate}\%_{y-1} - \text{Actual System Loss “c” Rate}\%_{y-1} * RF$$

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.

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

This responsibility factor shall be determined by the Office, in consultation with the Licensee, having regard to the (i) nature and root cause of losses; (ii) roles of the Licensee and Government to reduce losses; (iii) actions that were supposed to be taken and resources that were allocated in the Business Plan; (iv) actual actions undertaken and resources spent by the Licensee; (v) actual cooperation by the Government; and (vi) change in external environment that affected losses.

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.

AFX_{y-1} = Foreign exchange result loss/(gain) incurred in year “y-1”.

TFX = The amount of foreign exchange result loss/(gain) included in the revenue requirement of the Base Year

SIC_{y-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.

AIC_{y-1} = Actual net interest expense/(income) in relation to interest charged to customers and late payments per paragraph 49 to 52 of Schedule 3 in year “y-1”.

TIC = The amount of net interest expense/(income) in relation to interest charged to customers and late payments included in the revenue requirement of the Base Year.

dPCI = Annual rate of change in non-fuel electricity revenues as defined below

WACC = The Weighted Average Cost of Capital determined in the Rate Review process.

The annual Performance-Based Rate-Making (PBRM) filing will follow the general framework where the rate of change in the Revenue Cap will be determined through the following formula:

$$dPCI = dI \pm Q \pm Z$$

where:

dI = the growth rate in the inflation and JMD to USD exchange rate measures;

Q = the allowed price adjustment to reflect changes in the quality of service provided to the customers versus the target for the prior year;

Z = the allowed rate of price adjustment for special reasons, not under the control of the Licensee and not captured by the other elements of the formulae; and

Each of these essential components of the PBRM framework is described below:

The Growth Rate (dI)

The rate of change of the Revenue Target ($dPCI$) applied annually is the adjustment to the annual Revenue Cap as established during the 5 year rate review process.

The growth rate (dI) represents the changes in the value of the JMD against the USD and the inflation in the cost of providing electricity products and services.

Specifically, dI is set as:

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

where

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

EX_n = Applicable US exchange rate at Adjustment Date.

INF_{US} = 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.

INF_J = 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.

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

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

The Z-Factor

$Z = (\text{Government Imposed Action} + \text{Impaired Assets} + \text{Funding of Special Programs})_{y-1} - (\text{Government Imposed Action} + \text{Impaired Assets} + \text{Funding of Special Programs})_{RC-Base-year} +$

approved excessive variation in ROE catch-up + any variation in any other special circumstances as defined in clause 46d and not covered before”

3.13. In accordance with Sections 4(4) and 4(4A), 11 and 12 of the OUR Act, as well as Condition 15 and Schedule 3 of the Licence, the Office makes the **DETERMINATIONS** set out below.

4 OUR's Analysis of the Proposal

4.1 Computation of the Annual Rate of Change (dPCI)

Background

4.1.1. Exhibit 1 of the Licence 2016 states that the annual rate of change of the revenue target (dPCI) is to be determined by the following formula:

$$dPCI = dI \pm Q \pm Z$$

Where:

- dI = the growth rate in the inflation and JMD to USD exchange rate measures
- Q = the Q-Factor (*i.e. the allowed price adjustment to reflect changes in the quality of service provided to the customers versus the target for the prior year*)
- Z = the Z-factor (*i.e. the allowed rate of price adjustment for special reasons, not under the control of the Licensee and not captured by the other elements of the formulae*)

4.1.2. Exhibit 1 further states that the growth rate inflation and exchange rate (dI) be? set as:

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

Where:

- EX_b = Base US exchange rate at the start of the Rate Review period.
- EX_n = Applicable US exchange rate at Adjustment Date.
- INF_{US} = 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.
- INF_J = 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.
- USP_b = US portion of the total non-fuel expenses as determined from the Base Year.
- USDS_b = US debt service portion of the non-fuel expenses as determined from financials in the Base Year of the rate setting period.

4.1.3. Conceptually, the purpose of the rate of change (dPCI) factor is to ensure that the revenue cap for the current year is kept constant in real terms. Consequently, the basic revenue cap (RC_Y) is adjusted to include the effect of **dPCI** and this results in what is referred to in this Determination Notice as the **Adjusted Revenue Cap**. The Adjusted Revenue Cap, as shown

below, captures the effect of inflation and exchange rate movement over the 2019 base year values.

$$\text{Adjusted Revenue Cap} = \text{RC}_y (1 + \text{dPCI})$$

4.2 JPS' Proposals

2021 Revenue Cap (RC₂₀₂₁)

4.2.1 In its submission, JPS indicated the use of the approved revenue cap of \$37,857M, as stated in the 2019-2024 Determination Notice, notwithstanding that it is the subject of an appeal filed by the company, which is yet to be determined.

4.3 Rate of Change of the Revenue Cap (dPCI)

4.3.1 JPS requested an inflation and FX growth rate (dI) of 18.51% and that the revenue cap growth rate (dPCI) be set at 27.02%. JPS predicated its request on the following factors:

- Jamaican point-to-point inflation (INF_J) of 14.00% for the period 2018 March - 2021 March;
- U.S. point-to-point inflation rate (INF_{US}) of 6.14% for the period 2018 March - 2021 March;
- A 13.28% increase in the Base Exchange Rate moving from J\$128.00: US\$1 to J\$145.00: US\$1;
- A Q-Factor of zero; and
- A Z-Factor adjustment of 8.51% based on the company's computation of a revenue gap adjustment for the year 2020.

4.4 Foreign Exchange and Interest Surcharges

4.4.1 In its submission, JPS stated that provisions in the 2020 revenue requirement for FX losses and interest income are as follows:

- **FX Losses (TFX):** J\$280M. When adjusted for the 2020 growth rate (dI) of 13% as computed in Table 18.18 of the 2019-2024 Determination Notice, the approved FX losses provision for 2020 is J\$316.4M.
- **Net Interest Expense (TIC):** J\$52.986M of Interest on Customer Deposits and J\$212.114M of Debt Issuance Costs (US\$0.414M and US\$1.657M respectively as per Table 11.12 of the 2019-2024 Determination Notice) offset by J\$317.696M of Interest Income (US\$2.482M as per Table 11.34 of the 2019-2024 Determination Notice). When adjusted for the 2020 growth rate (dI) of 13% as computed in Table 18.18 of the 2019-2024 Determination Notice, the approved TIC provision for 2020 is J\$59.4M.

- 4.4.2 JPS presented actual FX losses (AFX) of J\$2.294 billion, which it asserted is computed as actual recorded FX losses at the average exchange rate for 2020 of J\$142.84: US\$1. In addition, actual net interest income (AIC) was computed as actual net interest income at the same exchange rate of J\$142.84: US\$1.
- 4.4.3 Based on those assumptions, JPS proposed FX and interest surcharges of J\$1.978 billion and J\$271.03 million respectively.

4.5 Revenue Surcharge

- 4.5.1 The revenue surcharge is comprised of the true-up for volume adjustments and the true-up for System Losses. Although JPS included a system losses penalty in the 2021 Annual Revenue Target (ART), the company argued that the target true-up for System Losses should not be applicable for 2020 based on the following grounds:
1. The subject targets are applicable to periods prior to the effective date of the 2019-2024 Determination Notice and targets cannot be applied retroactively.
 2. In any event, the system losses targets that were set at the height of the COVID-19 pandemic are not reasonable and achievable, and therefore inconsistent with the requirements of paragraph 37 of Schedule 3 of the Licence 2016.
- 4.5.2 Notwithstanding, JPS stated that its proposed true-ups reconcile actual performance during 2020 against the targets set for that year. The result is a reduction of the 2021 ART of J\$773 million. The reduction is explained as follows:
- a) Volumetric performance adjustment of **negative J\$38.2 million**.
 - b) System Losses performance adjustment of **negative J\$735.2 million**.

4.6 The OUR's Position

The 2021 Revenue Cap (RC₂₀₂₁)

4.6.1 In accordance with Determination #29 of the 2019-2024 Determination Notice, the revenue cap approved for the 2021 review period is J\$37,857M.

4.7 The Rate of Change of the Revenue Cap (dPCI)

4.7.1 JPS indicated that its 2019-2024 Rate Review Application was expressed in 2018 values. Because paragraph 18.129 of the 2019-2024 Determination Notice stated that, “the approved revenue caps were based on “real 2018 prices”, JPS proposed an adjusted revenue cap based on changes in CPI between 2018 March and 2021 March.

4.7.2 Consistent with previous 5-year rate reviews, all costs, which are used to determine revenue requirements, are based in the given year of the review (i.e., 2019 values in the case of the 2019-2024 Rate Review). The 2018 audited financial accounts was presented in support of the JPS’s 2019-2024 Rate Review application. During the 2019-2024 Rate Review process, in setting the base tariff, costs were adjusted to account for all known and measurable changes that would occur within 12 months of the 2018 audited accounts. JPS also submitted its 2019 audited accounts, and this was relied on in the process of evaluating and setting the base tariffs.

4.7.3 The reference to “real 2018 prices” in paragraph 18.129 of the 2019-2024 Determination Notice, was an inadvertent error, as it should have instead said “real 2019 prices”. Consistent with previous 5-year rate reviews, all costs, which are used to determine revenue requirements, were based on the given year of the review (i.e., 2019 values in the case of the 2019-2024 Rate Review). The 2018 audited financial accounts was presented in support of the JPS’s 2019-2024 Rate Review application. During the 2019-2024 Rate Review process, in setting the base tariff, costs were adjusted to account for all known and measurable changes that would occur within 12 months of the 2018 audited accounts. JPS also submitted its 2019 audited accounts, and this was relied on in the process of evaluating and setting the base tariffs.

4.7.4 Tables 18.18 and 18.15 of the 2019-2024 Determination Notice showed the actual calculation of the 2020 growth rate of 13%, which was computed using the 2019 March consumer price indices as the base year (these tables are replicated below). The period to be used for the point-to-point inflation factors in the calculation of the growth rates should therefore be 2019 March to 2021 March, and not starting at 2018 March as proposed by JPS in its submission.

Table 4.1: The 2020 Growth Rate (dI)

Line	Description	Formula	Value
L1	Base Exchange Rate		128.00
L2	Adjusted Billing Exchange Rate		145.00
L3	Jamaican Inflation Index		
L4	CPI @ March 2020		103.6
L5	CPI @ March 2019		98.2
L6	US Inflation Index		
L7	CPI @ March 2020		258.1
L8	CPI @ March 2019		254.2
L9	Exchange Rate Factor	$(L2-L1)/L1$	13.28%
L10	Jamaican Inflation Factor	$(L4-L5)/L5$	5.50%
L11	US Inflation Factor	$(L7-L8)/L8$	1.54%
L12	Growth Rate (dI)	$L9*[0.8+(0.8-0.0688)*L11] + (0.8-0.0688)*L11+(1-0.8)*L10$	13.00%

Extracts: Tables 18.18 from the 2019-2024 Determination Notice

Table 4.2 - JPS's Approved Revenue Caps @ J\$128.00: US\$1.00

	Unit	2019	2020	2021	2022	2023
Revenue Cap @ Constant Prices	J\$'M	37,439	36,470	37,857	37,957	38,783
Revenue Cap (Growth adjusted)	J\$'M	37,362	41,211	-	-	-
Base Exchange Rate	J\$/US\$	128	145	-	-	-
US Inflation Rate	%	N/A	15.4%	-	-	-
Jamaica Inflation Rate	%	N/A	5.5%	-	-	-
Growth Rate	%		13%	-	-	-

Extracts: Tables 18.15 from the 2019-2024 Determination Notice

4.7.5 The Office approves an inflation and foreign exchange growth rate (dI) of 16.16% and a revenue cap growth rate (dPCI) of 19.27%. These rates are based on the following factors:

- Jamaican point-to-point inflation¹ (INF_J) of 10.29% for the period 2019 March - 2021 March;
- U.S. point-to-point inflation rate² (INF_{US}) of 4.20% for the period 2019 March - 2021 March;
- A 13.28% increase in the Base Exchange Rate moving from J\$128.00: US\$1.00 to J\$145.00: US\$1.00;
- A Q-Factor of zero; and
- A Z-Factor adjustment of 3.11% based on OUR's computation of adjustments for a 2020 Revenue Gap and Capital Project Delays for the year 2020.

¹ Derived from the CPI data published by the Statistical Institute of Jamaica.

² Obtained from U.S. Bureau of Labor Statistics website, <http://data.bls.gov/cgi-bin/surveymost>

4.7.6 The full adjustment to the approved Rate of Change of the Revenue Cap (dPCI) 19.27% is calculated by adding the Q-Factor and Z-Factor adjustments to the Growth Rate (dI).

- The Q-Factor is based on three quality indices and is set at 0%. The details of the Q-Factor analysis and decisions are outlined in Chapter 9 of this Determination Notice;
- The computed value of the Z-Factor adjustment is 3.11%. The details of the analysis and decisions are outlined in Chapter 5 of this Determination Notice.

4.7.7 Details of the computations relating to the above are shown in Table 4.3 below.

Table 4.3 - The 2021 Growth Rate (dI) and the Rate of Change of the Revenue Cap (dPCI)

Line	Description	Formula	Value
L1	Base Exchange Rate		128.00
L2	Adjusted Billing Exchange Rate		145.00
L3	<u>Jamaican Inflation Index</u>		
L4	CPI @ March 2021		108.3
L5	CPI @ March 2019		98.2
L6	<u>US Inflation Index</u>		
L7	CPI @ March 2021		264.9
L8	CPI @ March 2019		254.2
L9	Exchange Rate Factor	$(L2-L1)/L1$	13.28%
L10	Jamaican Inflation Factor	$(L4-L5)/L5$	10.29%
L11	US Inflation Factor	$(L7-L8)/L8$	4.20%
L12	The Growth Rate (dI)	$L9*(0.8+(0.8-0.0688)*L11)+(0.8-0.0688)*L11+(1-0.8)*L10$	16.16%
L13	Q Factor		0.00%
L14	Z Factor		3.11%
L15	The Rate of Change of the Revenue Cap (dPCI)	dI +/- Q +/- Z	19.27%

4.8 The Adjusted Revenue Cap

4.8.1 The Adjusted Revenue Cap for 2021 ($Adj.RC_{2021}$) = $RC_{2021} * (1 + dPCI)$

$$= J\$37,856,804,905 \times (1 + 19.27 \%)$$

$$= J\$44,578,820,493.00$$

Determination 1

Having reviewed JPS's proposal for the computation of the Growth Rate of Inflation and Foreign Exchange Rate and the Rate of Change of the Revenue Cap, the Office approves:

- A Growth Rate (dI) of 16.16%
- A Rate of Change of the Revenue Cap (dPCI) of 19.27%
- An Adjusted Revenue Cap of J\$44,578,820,493.00

4.9 The Foreign Exchange and Interest Surcharges (SFX₂₀₂₀ - SIC₂₀₂₀)

4.9.1 Paragraph 31, Schedule 3 of the Licence 2016 makes provision for JPS to make adjustments to the revenue requirement for FX loss/gain, which are not directly associated with investments in capital plant and other operating costs, provided they are deemed to be prudently incurred costs.

4.9.2 The Annual Adjustment mechanism described in Exhibit 1 of the Licence 2016, includes the true-up for FX losses (FX surcharge), which is offset by an interest surcharge on customer arrears. In the 2019-2024 Determination Notice provisions were approved for FX losses and Interest Surcharges (Expense/Income Annual Adjustment) in the amount of J\$280 million and J\$50 million respectively. These amounts were included in the revenue requirement for the years 2020 – 2023 (see Table 4.4 below for details of the composition of the approved offset to the revenue requirement 2019 – 2024).

Table 4.4 - Composition of the Approved Offset to the Revenue Requirement 2019-2023

Revenue Requirement (J\$'000')	2019	2020	2021	2022	2023
	OUR Allowed				
Other Offsets:					
Finance Income	721,664	317,696	317,696	317,696	317,696
Net Interest Expense/(Income)-Annual Adjustment	-	50,000	50,000	50,000	50,000
Other Income	147,000	166,000	168,000	164,000	163,000
Bond Refin. Costs (Rec. per 2018/19 Deter.)	340,000	-	-	-	-
Accelerated Depreciation (Rec. per 2018/19 Deter.)	-	-	-	-	-
Z-Factor	-	-	-	-	-
Separation Costs	-	-	-	-	-
System Benefit Fund Settlement	-	757,228	757,228	757,228	757,228
ALRIM Over-recovery	-	-	-	-	-
ALRIM System Losses	-	-	-	-	-
Adjustment for Cement Company Rev	670,098	688,993	725,659	750,982	777,282
JPS Managed Assets (IPP & BD)	22,575	34,481	35,840	36,969	38,140
	1,901,337	2,014,398	2,054,423	2,076,875	2,103,346

- 4.9.3 In its computation, JPS accounted for the J\$280 million provision for FX losses. However, the company did not account for the provisional J\$50 million offset for Expense/Income Annual Adjustment.
- 4.9.4 JPS in its application, argued that actual realized 2020 interest income in relation to the interest charged to commercial and government accounts was J\$316.4M offset by the actual realized interest expense of J\$149.1M paid on customer deposits, short-term loans and debt issuance costs. JPS also stated that actual of late payment fees in 2020 were J\$163.4M, and that FX losses in 2020 reflected realized currency losses of J\$2,294.2M.
- 4.9.5 To arrive at the FX surcharge for 2020 (SFX2020) the actual amount reported in JPS's audited accounts should be trued-up against the amount that was set as a target in the 2019-2024 Determination Notice. Similarly, the interest surcharge for 2020 (SIC2020) should be calculated as a true-up of the actual net interest expense/(income) (including net late payment fee) as reported in JPS's audited accounts against the amount that was set as a target in the 2019-2024 Determination Notice.
- 4.9.6 In its 2020 Audited Financial Report, JPS reported FX losses of J\$1,047.7 million (US\$7.335 million). Actual net interest cost (AIC₂₀₂₀) was reported as J\$470.37 million (US\$3.293million) (see Table 4.5 below for details).

Table 4.5 - Computation of the Target and Actual Net Interest Expenses 2020

Net Interest Expenses						
	Target Interest Cost (TIC)				Actual Interest Cost (AIC)	
	JPS		OUR		2020 Audited Accounts	
	J\$'000'	J\$'000' Gross up @13%	J\$'000'	J\$'000' Gross up @13%	US\$'000'	J\$'000'
Customer Deposit	52,986	59,875	52,986	59,875	509	72,715
Debt Issuance Costs	212,114	239,689	212,114	239,689	1,527	218,146
Offset:						
Interest Income	(317,696)	(358,996)	(317,696)	(358,996)	-5,329	(761,231)
Expense/(Income)-Annual Adjustment		-	(50,000)	(56,500)		
Total	(52,595)	(59,433)	(102,595)	(115,933)	(3,293)	(470,370)

4.9.7 Based on the foregoing calculations in paragraphs 4.23 and 4.24 above, the FX Surcharge and Interest Surcharge offset adjustment approved by the Office is \$376.8 million. The computation is shown in Table 4.6 below.

Table 4.6 – Computation of the FX Surcharge and Interest Surcharge offset (SFX₂₀₂₀ - SIC₂₀₂₀)

FX and Interest Surcharge for 2020 (SFX ₂₀₂₀ - SIC ₂₀₂₀)			
Line	Description	Formula	Value (J\$)
	FX Surcharge		
L1	TFX ₂₀₂₀		316,400,000
L2	AFX ₂₀₂₀		1,047,672,512
L3	SFX₂₀₂₀	L2-L1	731,272,512
	Interest Surcharge		
L4	Actual net interest expense/(income) in relation to interest charged to customers for 2020		290,861,310
L5	Actual Net Late Payment fees for 2020		(761,231,092)
L6	AIC ₂₀₂₀	L4+L5	(470,369,782)
L7	TIC ₂₀₂₀		(115,932,626)
L8	SIC₂₀₂₀	L6-L7	(354,437,157)
L9	SFX₂₀₂₀ offset SIC₂₀₂₀	L3 offset L8	376,835,355

4.10 The Revenue Surcharge (RS₂₀₂₀)

4.10.1 The revenue true-up mechanism can be broken down into four main components:

1. *Revenue Surcharge (RS_{y-1})*: which is comprised of:
 - a. The Volumetric Adjuster (TUVol_{y-1})
 - b. The System Losses Adjuster (TULos_{y-1})
2. *Foreign Exchange (FX) Surcharge (SFX_{y-1})*
3. *Interest Expense Surcharge (SIC_{y-1})*; and
4. *Opportunity Cost Adjuster (1+WACC)*

Taken all together, the revenue true-up component of the PBRM can be expressed as:

$$\text{Revenue True Up} = (\text{RS}_{y-1} + \text{SFX}_{y-1} - \text{SIC}_{y-1}) * (1 + \text{WACC})$$

Where, $\text{RS}_{y-1} = \text{TUVol}_{y-1} + \text{TULos}_{y-1}$

4.10.2 In any given year, if the actual revenue registered by JPS exceeds the established revenue target, the ‘Revenue True-up’, which is the difference in revenue, would be negative. As such, the company’s revenue in the following year would have to be adjusted downward by the difference. On the other hand, if the ‘Revenue True-up’ is positive, that is, the company’s actual registered revenue is less than the established target; JPS’s revenue requirement would have to be increased the following year to recover the revenue difference.

4.11 True-Up Volumetric Adjustment (TUVol₂₀₂₀)

4.11.1 The volumetric adjustment for any year is dependent on the variance between the target billing determinants and those that were actually achieved during that year.

4.11.2 For the Volumetric Adjuster (TUVol_{y-1}), the true-up is based on JPS’s performance in the previous year against energy (kWh), demand (kVA) and the number of customer charges billed. In this regard:

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

Where:

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

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

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

4.11.3 The non-fuel revenue targets for energy demand and customer charge is matched to the respective components of the target billing determinants. The billing determinant targets for 2020 approved in Determination #24 of the 2019-2024 Determination Notice are as follows:

- Energy sales : 3,068 GWh
- Billing demand : 4,700,980 kVA
- Customer forecast : 690,051

4.11.4 Table 4.7 below shows the details of the approved annual revenue target for 2020. The overall total annual revenue target of \$41,211,019,369 was assigned based on the tariff functions as follows:

• Energy Revenue Target	-	\$26,716,384,164
• Demand Revenue Target	-	\$ 9,436,428,713
• Customer Charge Revenue Target	-	<u>\$ 5,058,206,492</u>
Total		<u>\$ 41,211,019,369</u>

Table 4.7 – Approved Annual Revenue Target: 2020

Class	Customer Revenue	Energy Revenue				Demand (KVA) revenue				Demand Revenue	Total Revenue
		Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak		
	J\$	J\$	J\$	J\$	J\$	J\$	J\$	J\$	J\$	J\$	J\$
Rate 10 LV < 100	3,930,558,270	5,420,110,951	-	-	-	-	-	-	-	-	9,350,669,220
Rate 10 LV > 100	-	8,718,287,514	-	-	-	-	-	-	-	-	8,718,287,514
Rate 20 LV	913,344,216	5,261,238,651	-	-	-	-	-	-	-	-	6,174,582,866
	-	-	-	-	-	-	-	-	-	-	-
Rate 40 LV - Std	167,990,720	3,970,043,605	-	-	-	5,958,020,980	-	-	-	5,958,020,980	10,096,055,305
Rate 40 LV - TOU	10,913,135	-	253,000,189	237,843,022	66,869,924	-	94,770,742	319,884,638	347,053,942	761,709,322	1,330,335,592
Rate 50 MV - Std	11,736,660	1,026,905,628	-	-	-	1,027,048,690	-	-	-	1,027,048,690	2,065,690,978
Rate 50 MV - TOU	2,169,335	-	95,600,911	102,372,075	30,191,551	-	48,496,269	125,664,903	124,708,801	298,869,973	529,203,845
Rate 70 MV -STD	1,807,303	775,045,305	-	-	-	1,161,508,122	-	-	-	1,161,508,122	1,938,360,730
Rate 70 MV -TOU	383,367	-	76,269,752	65,132,885	21,753,583	-	31,059,369	85,730,674	112,481,582	229,271,626	392,811,212
Rate 60 LV	19,303,486	595,718,621	-	-	-	-	-	-	-	-	615,022,107
	-	-	-	-	-	-	-	-	-	-	-
TOTAL	5,058,206,492	25,767,350,274	424,870,852	405,347,981	118,815,057	8,146,577,792	174,326,381	531,280,215	584,244,326	9,436,428,713	41,211,019,369

4.11.5 As shown in Table 4.8 below, the volumetric adjustment based on actual 2020 billing determinants is negative \$38.2 million. This is the aggregate of surcharge adjustments for energy, demand and customer charges in the amounts of \$1,132.0 million, (\$1,227.7) million and \$57.5 million respectively. The result of the computation accords with the proposal from JPS.

Table 4.8 – Computation of the Volumetric Adjustment (TUVol₂₀₂₀)

Volumetric Adjustment (TUVol ₂₀₂₀)			
Line	Description	Formula	Value (J\$)
	Energy Surcharge		
L1	kWh Target ₂₀₂₀		3,067,885,952
L2	kWh Sold ₂₀₂₀		2,937,892,548
L3	Revenue Target for Energy		26,716,384,165
L4	kWh Surcharge	(L1-L2)/L1*L3	1,132,034,820
	Demand Surcharge		
L5	kVA Target ₂₀₂₀		4,700,980
L6	kVA Sold ₂₀₂₀		5,312,587
L7	Revenue Target for Demand		9,436,428,713
L8	kVA Surcharge	(L5-L6)/L5*L7	(1,227,697,645)
	Customer Count Surcharge		
L9	#Customer Charges Billed Target ₂₀₂₀		690,051
L10	#Customer Charges Billed ₂₀₂₀		682,206
L11	Revenue Target for Customer Charges		5,058,206,492
L12	Customer Charges Surcharge	(L9-L10)/L9*L11	57,503,020
L13	TUVol₂₀₂₀	L4+L8+L12	(38,159,806)

4.12 True-Up System Losses Adjustment (TULos₂₀₂₀)

4.12.1 In computing the System Losses true-up (TULos₂₀₂₀), the disaggregation of the System Losses into its three (3) established components (i.e. TL, JNTL and GNTL) is required.

Where:

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

4.12.2 Each component of System Losses is measured against a target that is established by the OUR as shown in the following equations:

$$Y_{a_{y-1}} = \text{Target System Loss "a" Rate}_{0_{y-1}} - \text{Actual System Loss "a" Rate}_{0_{y-1}}$$

$$Y_{b_{y-1}} = \text{Target System Loss "b" Rate}_{0_{y-1}} - \text{Actual System Loss "b" Rate}_{0_{y-1}}$$

$$Y_{c_{y-1}} = (\text{Target System Loss "c" Rate}_{0_{y-1}} - \text{Actual System Loss "c" Rate}_{0_{y-1}}) * RF$$

Where:

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

4.12.3 The variances of JPS's actual performance on the three System Losses components from their related targets are used to compute a total variance Y_{y-1} in year "y-1" as shown below:

$$Y_{y-1} = Y_{a_{y-1}} + Y_{b_{y-1}} + Y_{c_{y-1}}$$

4.12.4 $TULos_{y-1}$ for year "y-1" (the year preceding the adjustment year) is computed as:

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

4.12.5 JPS presented actual System Losses figures as follows:

- Technical losses (TL) : 7.91% (7.86% adjusted)
- Non-technical losses (NTL) : 20.12% (20.00% adjusted)
 - JNTL : 5.82% (6.15% adjusted)
 - GNTL : 14.30% (13.85% adjusted)

4.12.6 JPS's proposed System Losses performance adjustment of negative \$735.2 million if the targets are applied, and zero, if the targets are not applied.

4.12.7 The OUR's computation results in a true-up System Losses adjustment of negative J\$850.6 million. See Table 4.9 below for details of the computation.

Table 4.9 – Computation of the 2020 System Losses Adjustment

System Losses Adjustment (TULos ₂₀₂₀)			
Line	Description	Formula	Value (J\$)
Losses Surcharge			
L14	Actual TL ₂₀₂₀		7.91%
L15	Target TL ₂₀₂₀		7.78%
L16	Ya ₂₀₂₀	(L15-L14)	-0.13%
L17	Actual JNTL ₂₀₂₀		6.17%
L18	Target JNTL ₂₀₂₀		4.71%
L19	Yb ₂₀₂₀	(L18-L17)	-1.46%
L20	Actual GNTL ₂₀₂₀		13.95%
L21	Target GNTL ₂₀₂₀		11.58%
L22	RF		20.00%
L23	Yc ₂₀₂₀	(L21-L20)*L22	-0.4740%
L24	Y ₂₀₂₀	L16+L19+L23	-2.06%
L25	ART ₂₀₂₀		41,211,019,369
L25	TULos₂₀₂₀	L24*L25	(850,595,440)

4.12.8 Based on the OUR's analysis, the Revenue surcharge for 2020 (RS₂₀₂₀) = TUVol₂₀₂₀ + TULos₂₀₂₀ = (J\$888,755,245). See Table 4.10 below for details.

Table 4.10 – Computation of the 2020 Revenue Surcharge

Revenue Surcharge for 2020 (RS ₂₀₂₀ = TUVol ₂₀₂₀ + TULos ₂₀₂₀)	
TUVol ₂₀₂₀	(38,159,806)
TULos ₂₀₂₀	(850,595,440)
RS₂₀₂₀	(888,755,245)

4.13 The Revenue True-Up 2020 and the 2021 Annual Revenue Target (ART₂₀₂₁)

- 4.13.1 In accordance with the Licence 2016, the WACC is to be applied as an opportunity cost adjustment to the 2020 true-ups. The applicable WACC for the 2021 Annual Adjustment is 11.87%, which is the WACC that was set by the OUR in the 2019-2024 Determination Notice. As shown in Table 4.11 below, the total amount for the 2020 revenue true-up is negative \$572.7 million inclusive of the opportunity cost. This represents a net reduction to the 2021 Adjusted Revenue Cap (Adj.RC₂₀₂₁) instead of the \$1,044.2 million increase proposed by JPS.
- 4.13.2 The forgoing computations result in an ART₂₀₂₁ of J\$44,578.8 million. JPS proposed an ART₂₀₂₁ of J\$49,130.3 million. See Table 4.12 below for details.

Table 4.11 – Computation of the 2020 Revenue True-Up

2020 Revenue True-Up				
Line	Description	Formula	JPS Value	OUR Value
L1	Revenue Surcharge 2020 ($RS_{2020} = TUVol_{2020} + TULos_{2020}$)		(773,364,391)	(888,755,245)
L2	FX and Interest Surcharge (SFX_{2020} offset SIC_{2020})		1,706,774,952	376,835,355
L3	WACC		11.87%	11.87%
L4	2020 Revenue True-Up	(L1+L2)x(1+L3)	1,044,206,394	(572,684,781)

Table 4.12 – Computation of the 2021 Annual Revenue Target (ART₂₀₂₁)

2021 Annual Revenue Target (J\$)		
Description	Formula	Value
Approved Revenue Cap	RC_{2021}	37,856,804,905
Annual Rate of Change	dPCI	19.27%
Adjusted Revenue Cap	$RC_{2021} * (1 + dPCI)$	45,151,505,274
Revenue Surcharge	RS_{2020}	(888,755,245)
FX Surcharge	SFX_{2020}	731,272,512
Interest Surcharge	- SIC_{2020}	(354,437,157)
WACC		11.87%
2020 Adjustments	$(RS_{2020} + SFX_{2020} - SIC_{2020}) * (1 + WACC)$	(572,684,781)
2021 Annual Revenue Target	ART₂₀₂₁	44,578,820,493

Determination 2

Consistent with the methodology outlined in the Licence 2016, the Office has determined the following:

- 1 Revenue True-up for 2020 shall be negative \$572,684,781 inclusive of the application of the opportunity cost (or WACC)
- 2 Annual Revenue Target for 2021 (ART₂₀₂₁) shall be J\$44,578,820,493

5 Z-Factor and Special Tariff Adjustment

5.1 Recovery of 2020 Revenue Gap

Background

5.1.1. Schedule 3 of the Licence 2016 sets out the basis and methodology for the application of price controls. Paragraph 16, Schedule 3 of the Licence 2016 provides that the five-year Rate Review was scheduled for 2019 April. JPS submitted an initial application dated 2019 July 31, which in accordance with the provisions of the Licence 2016, the OUR rejected as being deficient to the extent that it would not allow a complete evaluation.

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- 5.1.2. On 2019 December 30, JPS submitted a revised 2019 - 2024 Rate Review application (Rate Review Application) which was accepted by the OUR, in accordance with the provisions of the Licence 2016, by letter dated 2020 January 13.
- 5.1.3. The OUR, after reviewing the Rate Review Application, issued the 2019-2024 Determination Notice dated 2020 December 24, with the new rates taking effect as of 2020 December 28. Subsequent to the publication of the Determination Notice, the OUR issued an Addendum with revised rates on 2021 January 29. JPS implemented the new rates in the 2021 February billing period.

5.2 JPS's Proposal

- 5.2.1. In its 2021 Annual Review submission, JPS indicated that the OUR, in the 2019-2024 Determination Notice, approved a revenue cap of J\$41.2B for the year 2020 to be collected through its levelized tariffs and forecasted billing determinants. JPS argued that although its levelized tariff was approved in 2020 December, its rates were implemented in 2021 February because of the lateness of the issue of the 2019-2024 Determination Notice.
- 5.2.2. The company expressed the view that the delays in the implementation of the new 2020 rates meant that revenues collected up to 2021 January were based on the old 2018 approved rates, thus creating a price variance and a resultant revenue gap of J\$4.10B or J\$3.22B respectively, depending on the methodologies presented. The company, however, proposed that a Z-Factor adjustment of 8.51%, predicated on its J\$3.22B methodology be applied to compensate it for the associated 2020 revenue shortfall.
- 5.2.3. According to JPS's submission, its Z-Factor claim is supported by paragraph 46 (d) (i) of Schedule 3 of the Licence, which states as follows:

"[46] d. The Z Factor reflects the 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 following special circumstances:

i. Any special circumstances that satisfy all the following:

- a) affects the Licensee's costs or the recovery of such costs, including asset impairment adjustments;*
- b) are not due to the Licensee's managerial decisions;*

- c) *have an aggregate impact on the Licensed Business for more than \$50M in any given year; and*
- d) *are not captured by other elements of the revenue cap mechanism.”*

5.3 **Calculation of the Revenue Gap/Tariff Implementation Delay Adjustment**

5.3.1. JPS stated that notwithstanding that it has appealed the OUR’s decisions in the 2019-2024 Determination Notice that have given rise to the 2020 revenue gap, it utilized two methodologies to compute the 2020 revenue gap. Both methodologies gave different results.

5.4 **Computation of 2020 Revenue Gap- Initial Method**

5.4.1. For Initial Methodology, JPS used the OUR’s approved billing determinants for 2020 and the rates which were in effect from 2020 (excluding embedded IPP rates) to calculate the effective revenue cap and subsequent revenue shortfall for 2020. The calculated effective revenue cap using this methodology was J\$33.1B. Table 5.1 below shows the details of the computation.

Table 5.1 - JPS’s Calculation of the 2020 Revenue Gap using the Initial Method

Class	Block/ Rate Option	12 months Customer Revenue	Energy Revenue	Std.	Demand (KVA) revenue Off-Peak	Part Peak	On-Peak	Total Revenue
Rate 10	LV < 100	3,313,378,485	7,197,554,503					10,510,932,988
Rate 10	LV > 100	-	9,386,515,002					9,386,515,002
Rate 20	LV	804,441,985	10,877,239,278	-	-	-	-	11,681,681,263
Rate 40	LV - Std	147,960,168	3,787,152,766	3,922,878,956	-	-	-	7,857,991,890
Rate 40	LV - TOU	9,611,896	616,513,241	-	22,023,320	225,126,775	230,807,515	1,104,082,747
Rate 50	MV - Std	10,337,227	1,333,202,377	874,324,628	-	-	-	2,217,864,232
Rate 50	MV - TOU	1,910,672	292,654,180	-	11,216,871	101,203,556	95,485,353	502,470,633
Rate 70	MV -STD	1,591,807	671,783,953	710,045,568	-	-	-	1,383,421,329
Rate 70	MV -TOU	337,656	127,958,848	-	6,837,262	66,700,802	73,380,871	275,215,439
Rate 60	LV	17,001,848	1,170,790,475	-	-	-	-	1,187,792,322
TOTAL		4,306,571,745	35,461,364,624	5,507,249,152	40,077,453	393,031,133	399,673,739	46,107,967,845
							Total Embedded IPP	12,967,470,686
							Total w/o IPP	33,140,497,159
					Revenue Cap @ old tariffs		USD	258,910,134
					Approved Revenue Cap		JMD	41,211,000,000
					Approved Revenue Cap		USD	284,213,793
					2020 Revenue Gap		USD	25,303,659
					2020 Revenue Gap (@145)		JMD	3,669,030,562
					Pre-tax WACC			11.87%
					WACC Adj 2019 Revenue Gap			4,104,544,489

Source: JPS’s Annual Tariff Adjustment Submission 2021, page 56.

5.4.2. JPS further stated that the resulting revenue gap was US\$25.3M. This was converted to JMD using an exchange rate of J\$145: US\$1 and then adjusted by the WACC of 11.87%, which resulted in a revenue gap of J\$4.1B.

5.4.3. JPS stated that this methodology has resulted in a lower than expected revenue cap, which is as a result of the difference in the sales mix in the approved demand forecast and that typical of actual sales. JPS further noted that although an effective revenue cap, which was too low, would overstate the revenue gap, a proper volumetric true-up mechanism would compensate by refunding excess amounts to prevent a net over-recovery. However, the company stated that the volumetric true-up outlined in Schedule 3 of the Licence 2016 only

considers overall volumes for energy, demand and number of customers but does not account for sales mix variances, thus JPS considered an alternative approach.

5.5 Computation of the 2020 Revenue Gap-Alternative Method

5.5.1. JPS explained that the Alternative Method was its preferred method in calculating the revenue gap. This method involved adjusting the J\$36,470M approved revenue cap for 2020 by the exchange rate of J\$145: US\$1 and the Jamaican and US inflation index. Tables 5.2 and 5.3 below show the details of the input data and the derived 2020 revenue cap amount respectively.

Table 5.2 - Inflation and Foreign Exchange Rate Adjustment

Exchange Rate		Jamaican Inflation Index		US Inflation Index	
FX 2018	128	Mar-18	95.0	Mar-18	249.6
FX 2020	145	Mar-20	103.6	Mar-20	258.1
F/X Factor	13.28%	J CPI Factor	9.05%	US CPI Factor	3.43%
F/X Effect	10.96%	J's CPI Effect	1.81%	US's CPI Effect	2.51%

Source: JPS's Annual Tariff Adjustment Submission 2021, page 57.

Table 5.3 - JPS's Calculated Revenue Cap

Year	Approved Revenue Cap	Approved Revenue Cap Adjusted for Inflation	Approved Revenue Cap Adjusted for Inflation and F/X
2020 (J\$)	36,470,000,000	38,045,111,063	42,041,547,047

Source: JPS's Annual Tariff Adjustment Submission 2021, page 57.

5.5.2. In order to derive the revenue gap for 2020, JPS calculated its actual revenues using actual billing determinants and tariffs that were in effect for 2020. JPS said that its actual revenues, net of IPP costs were J\$35,476M. No calculations were provided.

5.5.3. JPS stated that subtracting real revenues without IPP from the calculated revenue cap resulted in a revenue gap of J\$2,568M. The company explained that its calculated revenue gap must be rebased and adjusted for a volumetric surcharge of –J\$38.2B and a WACC of 11.87%.

5.5.4. JPS's calculation yielded a total revenue gap of J\$3.2 B. JPS requested that this be included in the Z-Factor adjustment and noted that its inclusion in the Z-Factor would lead to an adjustment of 8.51% to the approved 2021 Annual Revenue Target. Details of JPS's computation of the revenue gap is shown in Table 5.4 below.

Table 5.4 - JPS's 2020 Revenue Gap Computation

2020 Revenue Gap Computation	
Approved Revenue Cap Adjusted for Inflation @128	38,045,111,063
Real Revenue w/o IPPs @128	35,476,400,421
Revenue Gap @128	2,568,710,642
Fx Adj Factor (1.10625)	272,925,506
Revenue Gap @145	2,841,636,148
Volumetric @145	(38,159,806)
Total 2020 Revenue Gap @145	2,879,795,953
WACC (11.87%)	341,831,780
WACC Adj Total Gap @145	3,221,627,733

Source: JPS's Annual Tariff Adjustment Submission 2021, page 56.

5.6 The OUR's Position

5.6.1. The difficulties associated with the 2019-2024 Rate Review are realities that neither JPS nor the OUR have denied. In a letter to JPS dated 2020 April 02, the OUR noted that:

“Whatever may be the disagreements in approach to this matter, it is fair to say that both JPS and the OUR recognize the enormous challenges associated with this review process. This is evidenced in the delays, reversals, time consuming clarification sessions and debates concerning the application of the Electricity Licence. This may be a reflection of the fact that this time around the process is fairly novel and perhaps an indication that the fixes attempted to the rate review process in the 2020 process have not worked as well as intended and may therefore need to be revisited.”

5.6.2. In its response by letter dated 2020 April 15, JPS stated that:

We are in agreement with your comments on the [i]mperfections in the regulatory framework and we add that the 2019-2024 Rate Case presents an opportunity for us to learn and to improve the process going forward.

5.6.3. Further, the challenges of the new forward-looking revenue-cap review process was exacerbated with the arrival of the COVID-19 pandemic. This resulted in a review of several facets of the tariff including the 5-year demand forecast, heat rate trajectory and JPS's capital programme.

5.6.4. In light of this, the OUR takes the view that JPS should not suffer a disproportionate loss because of the less than timely completion of the 2019-2024 Determination Notice. Therefore, good regulatory practice suggests that JPS should be allowed to recover a revenue gap in the circumstances.

5.6.5. It is important to note that JPS's submission for the revenue gap encompasses all 12 months (January to December) of 2020, even though its revised application was not submitted to the OUR until 2019 December 30. In 2020 January, the OUR would have only just received the Rate Review Application, and therefore, rates could not conceivably have been adjusted at that time. In view of the provisions of the Licence 2016, the only date by which rates could

have been deemed to be adjusted, would be the Adjustment Date of 2020 July 1. This means that the new rates would have been reflected in the 2020 August billing.

- 5.6.6. In fact, 2020 July 1 was the date posited by the OUR even before it became apparent that the disruptive nature of COVID-19 necessitated the remodeling and revision of several aspects of the tariff. To this, JPS in the 2020 April 15 letter stated:

Each month of delay amplifies our challenges, which are further compounded by the COVID-19 pandemic whereby JPS must continually serve the customers despite the challenging environment both operationally and financially. In this regard, we cannot afford any delays beyond the July 1, 2020 date for the Determination proposed in your letter.

- 5.6.7. The OUR therefore takes the view that in the circumstances, 2020 July 1 would be a more reasonable date by which the tariff approved for 2020 could be deemed implemented. Further, given that the new tariff was actually implemented in 2021 February, the computation of the revenue gap should be computed over the 2020 August to 2021 January billing periods.
- 5.6.8. Given the approval of the revenue gap, the Office has also concluded that it was reasonable for an opportunity cost to be applied to the revenue flows from the nominal revenue gap. Accordingly, the Office has concluded that the WACC should be included in JPS's recovery of the final revenue gap.

5.7 Analysis of JPS's Revenue Gap Claim

- 5.7.1. The revenue gap is the difference between the revenues JPS would have received if the rates had been implemented over the relevant period and how much it actually received over the same period. Based on this interpretation, the revenue gap may be expressed as an equation, as follows:

The 'Actual Revenue Gap' (ARG) is:

$$ARG = P_T Q_A - P_A Q_A$$

Where:

P_T = Approved Price

P_A = Actual Price

Q_A = Actual Volume

- 5.7.2. As indicated above, JPS presented two revenue gap calculations. The 'Initial Method' and the 'Alternative Method'. The revenue gap in the Initial Method and Alternative Method were J\$4.10B and \$3.22B respectively. The main distinguishing feature of the two methods is the treatment of inflation and FX adjustment. However, both methods calculated the Total Revenue Gap (TRG) instead of the ARG. The Total Revenue Gap may be defined as:

$$\begin{aligned}
 \mathbf{TRG} &= \mathbf{Revenue\ Target} - \mathbf{Actual\ Revenue} \\
 &= P_T Q_T - P_A Q_A
 \end{aligned}$$

Where:

$$Q_T = \mathbf{Volume\ Target}$$

5.7.3. However, JPS’s formulation of the ARG is incorrect since it can be shown that the TRG is the sum of the Volumetric True-up (TUV) and the Actual Revenue Gap (ARG)³.

$$\mathbf{TRG} = \mathbf{TUV} + \mathbf{ARG}$$

5.7.4. JPS’s proposed formulation would result in a duplication of the Volumetric True-up, which had already been addressed in Section 1.2.4.1 of JPS’s Application.

5.7.5. Another weakness in JPS’s calculations is that it employed a broad-brush approach in its derivations. In particular, instead of looking at its actual revenue each month and comparing it with what the revenue would have been had new rates been implemented, JPS’s calculation was based on annual aggregations and averages. Such an approach is likely to be imprecise because there is seasonality in JPS’s billing determinants. Additionally, in 2020, typical customer behaviours were impacted by the effects of COVID-19, further increasing the probability of distorted results emerging from such a broad-brush approach.

5.7.6. Finally, it would appear that in the Initial Method, the foreign exchange methodology used did not effectively simulate how the foreign exchange mechanism works in the billing process. In the billing process, revenues are adjusted for the difference between the billing exchange rate and the Base Exchange rate. However, this adjustment was not taken into account.

5.7.7. Arising from this analysis, the OUR recomputed the revenue gap. The OUR’s calculation had the following characteristics:

- a) It was done over the 6-month billing period, 2020 August to 2021 January.
- b) It entailed computing and aggregating the monthly revenue for each rate class based on the customer, energy and demand charges.
- c) The computation in (b) above was done based on two (2) scenarios:
 - (i) The actual volumes at the approved 2020 rate.
 - (ii) The actual volumes at the old 2018 rate (non-fuel IPP costs were deducted)
- d) The ARG was determined by finding the difference between the two (2) scenarios in (c) above and captured in the equation:

$$\mathbf{ARG} = P_T Q_A - P_A Q_A$$

³ See Annex 3

5.7.8. Tables 5.5 and 5.6 summarize the results of the OUR's revenue gap calculation. As shown in Table 5.5, the revenue gap for the billing period 2020 August – 2021 January is \$1,547M.

Table 5.5 - Revenue at Old and New Rates (2020 August – 2021 January)

	Revenue @ New Rate (2020 Aug-2021Jan)				Revenue @ Old Rate (2020 Aug-2021Jan)			
	Customer	Energy	Demand	Total	Customer	Energy	Demand	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Rate 10	1,940,177,828	8,159,884,904		10,100,062,732	1,818,133,895	10,329,928,767		12,148,062,661
Rate 20	468,864,812	2,448,283,349		2,917,148,161	459,067,219	5,629,328,418		6,088,395,636
Rate 60	9,524,294	301,669,940		311,194,234	9,325,242	659,292,445		668,617,687
Rate 40	89,474,259	2,318,976,111	3,287,045,582	5,695,495,952	87,604,562	2,316,540,127	2,258,078,441	4,662,223,130
Standard	84,257,328	1,861,217,593	2,913,515,698	4,858,990,618	82,496,646	1,972,739,088	2,132,505,308	4,187,741,043
TOU	5,216,932	457,758,518	373,529,884	836,505,334	5,107,916	343,801,039	125,573,133	474,482,087
Rate 50	7,090,441	347,114,708	728,682,533	1,082,887,682	6,942,265	687,654,545	609,664,146	1,304,260,955
Standard	6,002,751	114,986,827	565,957,688	686,947,267	5,877,308	563,623,588	484,091,013	1,053,591,908
TOU	1,087,690	232,127,881	162,724,844	395,940,415	1,064,957	124,030,957	125,573,133	250,669,047
Rate 70	1,151,520	464,257,902	1,124,214,756	1,589,624,178	1,127,461	1,550,614,015	768,467,403	2,320,208,878
Standard	1,000,504	402,133,490	989,997,812	1,393,131,807	979,597	1,501,653,968	672,762,698	2,175,396,264
TOU	151,016	62,124,411	134,216,945	196,492,372	147,863	48,960,046	95,704,705	144,812,615
	2,516,283,155	14,040,186,914	5,139,942,871	21,696,412,939	2,382,200,643	21,173,358,316	3,636,209,990	27,191,768,949

5.7.9. Accordingly, the total Z-Factor adjustment for the revenue gap is J\$1,547M. Of this sum, J\$1,383M is attributable to the revenue and J\$164M is derived from the 11.87% WACC applicable. In relative terms, the associated Z-Factor is 4.09%.

Table 5.6 - Summary of 2020 Revenue Gap Calculation

	Revenue (\$) 2020 Aug - 2021 Jan
Old Rate Revenues	27,191,768,949
Less IPP Cost	6,878,698,775
Old Rate Revenues Adj.	20,313,070,173
New Revenues @ 2020 Approved Rate	21,696,412,939
Old Rate Revenues Adj.	20,313,070,173
Revenue Gap (before WACC)	1,383,342,766
WACC (pre tax) @ 11.87%	164,202,786
Revenue Gap (plus WACC)	1,547,545,553

Determination 3

Having reviewed JPS's proposal for the recovery of a Revenue Gap, the Office has approved a Z-Factor adjustment of 4.09% or J\$1,547,545,553 for the billing period 2020 August – 2021 January. The adjustments shall be as follows:

- Revenue Gap: J\$1,383,342,766
- Opportunity cost of J\$164,202,786

5.8 JPS's Capital Plan Z-Factor Adjustments

Background

- 5.8.1. As set out in the 2019-2024 Determination Notice the OUR approved a capital budget of US\$423.99M (excluding IDC) to allow JPS to carry out the approved capital investment projects over the 2019-2024 Rate Review period.
- 5.8.2. The approved projects included 51 Capital Projects/Programmes, 12 of which were classified as Major projects or Extraordinary Maintenance projects, while 39 were classified as Minor projects. In the 2019-2024 Determination Notice, the Office gave the JPS approval to invest US\$78.06M for the year 2020 on the approved capital budget. The approved capital budget is subject to annual Z-Factor adjustments in accordance with paragraph 46(d) of the Licence 2016 and Criterion 13 of the Final Criteria.
- 5.8.3. In its submissions, JPS sets out a capital project Z-Factor Adjustment Proposal for the year 2020. The OUR has assessed JPS's capital project Z-Factor proposal, including the investment performance relative to the approved investments.

5.9 JPS Capital Projects Overview

- 5.9.1. Section 7 of the Final Criteria, mandates that JPS's capital investment projects shall be classified in three (3) categories, namely:
- 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 non-routine capital projects related to routine plant replacements and overhauls valued at US\$10 Million or more;
 - c) *Minor 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 collectively.

- 5.9.2. Paragraph 7.1.1 of the Final Criteria provides that each category of projects shall be clearly identified in JPS's capital investment plan, and shall be assessed for Z-Factor adjustments on their individual merit.
- 5.9.3. In its 2019-2024 Rate Review Application, JPS submitted a Capital Investment Plan for the Rate Review period comprising projects spanning the following areas of its operations:
- Generation
 - Transmission
 - Distribution
 - System Losses mitigation
 - Information Technology (IT)
 - General Plant.
- 5.9.4. In this regard, JPS proposed a capital investment of US\$468.55M (excluding IDC) to carry out the projects. The OUR approved a budget of US\$423.99M (excluding IDC) in the 2019-2024 Determination Notice.
- 5.9.5. In its assessment of JPS's Capital Investment Plan during the 2019-2024 Rate Review process, the OUR applied a methodology which included technical, financial/economic and costing assessments of the projects. The OUR found that JPS generally followed the guidelines established in the Final Criteria for submitting information relating to the projects. The OUR took the view that the majority of the projects proposed were justified based on the cost/benefit analyses and/or other justifications provided and evaluated by the OUR.
- 5.9.6. Arising from its evaluation of the projects, the OUR approved the investment costs for the approved projects to the sum of US\$423.99M. In instances where the OUR suggested changes to projects, the OUR provided the extent of the changes and full explanation of the rationale for those changes.
- 5.9.7. Table 5.6 summarizes the 2019-2024 approved capital projects by operating categories and JPS's performance against the approved 2020 capital investments.

Table 5.7 - Summary of Approved Capital Projects

Summary of Capital Projects for the Tariff Period 2019-2024						
Capital Projects	(US\$'000)	OUR Approved		Actuals	2020 Variance	
	Total Cost	2019	2020	2020		
	(US\$'000)	(US\$'000)	(US\$'000)	(US\$'000)	(US\$'000)	%
Generation	78,808	16,826	15,503	11,544	-3,959	-25.5%
Transmission	69,746	16,377	9,514	4,112	-5,402	-56.8%
Distribution	144,840	30,815	31,259	25,953	-5,306	-17.0%
System Losses Mitigation	89,930	26,259	12,199	14,133	1,934	15.9%
Information Technology	26,481	2,991	6,050	1,938	-4,112	-68.0%
General Plant	14,184	3,096	3,532	2,032	-1,500	-42.5%
Totals	423,989	96,364	78,057	59,712	-18,345	-23.5%

5.10 Capital Projects Z- Factor Adjustments to Annual Revenue Requirement

5.10.1. 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.

5.10.2. The capital projects Z-Factor Adjustment mechanism is designed to ensure that JPS does not collect revenue to execute approved capital projects and then not implement these projects at all or as proposed.

5.11 JPS's Capital Projects Z-Factor Proposal

Annual Z-Factor Filing Requirements

5.11.1. In order to ensure that the annual assessment of capital projects is consistent, fair and unambiguous, JPS shall submit its capital investment projects in the Business Plan in a manner that conforms to the guidelines specified in Annex 5 of the Final Criteria. If any project straddles two (2) Rate Review periods the following shall apply:

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

5.12 JPS's Z-Factor Adjustments Capital Projects Submissions

5.12.1. JPS submitted the following documents in support of its annual filing capital projects Z-Factor proposal:

- JPS's ANNUAL FILING 2021 REVIEW, dated 2021 May 4;
- ANNUAL TARIFF ADJUSTMENT SUBMISSION FOR 2021 CAPEX - Projects;
- JPS's 2022 North East Coast Voltage Security Improvement Project and supporting documentation.

5.13 JPS Capital Investment Performance Summary

5.13.1. In the 2019-2024 Determination Notice, the Office gave JPS approval to invest US\$78.06M in the year 2020 on 51 Capital Projects/Programmes. Of these 51 Projects/Programmes, 12 were classified as Major projects or Extraordinary Maintenance projects while 39 were classified as Minor projects. For the year 2020, JPS spent US\$59.7M on the projects approved by the OUR. US\$39.5M was spent on Major projects and Extraordinary Maintenance projects, while US\$20.2M was spent on Minor projects. In the category of Major projects and Extraordinary Maintenance projects, seven (7) projects had delayed implementations, one (1) project was executed as planned while four (4) projects saw higher levels of investment than was approved by the OUR for 2020. The total variance in this category of projects is 5%. In the category of Minor projects, thirty-one (31) projects were delayed, three (3) were completed as planned and five (5) projects overspent the approved 2020 budget. The total variance in this category of projects is 44%.

5.13.2. The following supporting data sets were included in the JPS's submission:

- Listing of approved Major projects and Extraordinary projects by categories of operation including the OUR approved budget expenditures for the year 2020, the actual expenditures for the year 2020, and the expenditure variance relative to OUR approved budget expenditures.
- Listing of Minor approved projects by categories of operation including the 5-year OUR approved budget expenditures, actual expenditures for the year 2020, and the expenditure variance relative to OUR approved budget expenditures, and project implementation status.
- A listing of Major Project implementation details including each major project costing, project scope outline, project proposed benefits, timing of key project milestones, and project performance status.
- A projection of the 2021 Capex investment projections, which included for the Major and Minor projects by categories of operations, the 2020 Budget carry-over, the OUR approved budget for the year 2020, new capital budget project items, and a proposed capital budget for the year 2021.

5.13.3. For the year 2020, JPS has asserted that it spent US\$59.706M on the projects against an approved amount of US\$78.057M.

5.14 JPS's Proposal Key Elements

5.14.1. JPS proposed that no Z-Factor adjustments should be implemented for approved 2020 projects performance and made no claims at this time for costs related to projects, which overspent the approved 2020 budgets. JPS based their proposal on the following factors:

- The final approval of the capital projects for 2020 was provided in 2020 December, which meant that JPS would have been implementing the projects without certain knowledge of the final approved budget and scope.
- The COVID-19 pandemic disrupted the global supply chain of goods and services.
- The COVID-19 pandemic negatively affected economic activities in Jamaica including electricity demand and hence having a negative impact on revenue intake.

- The late approval of the new tariff by the OUR meant JPS could not benefit from the intended cash flows uplift that the new tariffs should bring. Cash flows were also suppressed by the reduction in economic activity in Jamaica that was brought on by restrictions imposed to combat the spread of the COVID-19 virus.
- JPS is currently challenging the approach of “...evaluating Major and Minor Projects individually as the company believes the intent of the licence is that all projects be evaluate[d] collectively.” JPS is currently challenging the approach of evaluating Major and Minor Projects individually as the company believes the intent of the Licence, 2016 is that all projects be evaluated collectively.

5.14.2. JPS provided its proposed capital projects Performance outlook for 2021, which made the following assertions:

- In 2021, JPS intends to execute the projects approved in the 2019-2024 Determination Notice for 2021 implementation, as well as the projects and scope deferred from 2020. Where there was overspend on projects in 2020, this will be offset against the 2021 approved amounts. Accordingly, by the end of 2021, the approved expenditure for 2020 and 2021 will be ‘expensed’ in total and the planned project activities will be completed.
- In 2021, JPS intends to execute two projects, which were not submitted in the 2019-2023 Medium Term Investment Plan. These projects are 40 MVARs Bulk Capacitor Banks and GT 10 Major Overhaul. According to JPS, both projects became necessary after the retirement of the B6 power plant at Hunts Bay. The OUR gave its approval for the implementation of these two projects in 2021 April.

5.15 Legal and Regulatory Framework Z-Factor Adjustment

Licence 2016 Requirements

5.15.1. Paragraph 46 d. of Schedule 3 of the Licence 2016 details the conditions that would trigger a Z-Factor adjustment. In particular, with regard to capital expenditure, sub-paragraph (iii) allows for a Z-Factor adjustment to the non-fuel rate in the following circumstances:

“(iii) 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;”

Final Criteria Requirement – Capital Project Z-Factor Adjustment

5.15.2. The regulatory treatment in relation to the evaluation of JPS’s capital investments pertaining to a Z-Factor Adjustment stipulates under Criterion 13 of the Final Criteria, that:

“In the Annual Review, a Z-Factor adjustment arising from JPS’ capital Investment plan may be triggered by:

- *Project delays*
- *Unimplemented projects*
- *Unplanned projects; and*
- *Changes in project scope*

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

- a) 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.*
- b) 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.*
- c) 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.*
- d) 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."*

5.16 OUR's Assessment of JPS's Capital Projects Z-Factor Proposal

- 5.16.1. The OUR's assessment of the capital projects Z-Factor adjustment is guided by the provisions of the Licence 2016 and Criterion 13 of the Final Criteria.
- 5.16.2. Accordingly, the provisions provided in Criterion 13 of the Final Criteria and the Licence 2016 were used to evaluate the status of projects, against those that were approved for year 2020, in the 2019-2024 Determination Notice.
- 5.16.3. Specifically, Section 4.5 and Section 7 of the Final Criteria provide the relevant guidance pertaining to JPS's Capital Investment Plan, in relation to a Z-Factor Adjustment.
- 5.16.4. The following provides the findings pertaining to each Major Project and Extraordinary Maintenance project according to the projects' categorization as explained in Criterion 13 of the Final Criteria.

Major Projects and Extraordinary Maintenance Projects Assessments

Combined Cycle Plant Rehabilitation

- 5.16.5. According to JPS, this project was completed in 2020 April, at a cost of US\$5.788M. The project scope involved the major overhaul of Bogue GT13 Unit. For 2020, the capital budget approved for this project was US\$5.514M.
- 5.16.6. The project cost exceeds the approved budget by US\$274,000, which represents approximately 4.97% of the approved budget.
- 5.16.7. The excess in expenditure would not satisfy the stated 5% threshold provision of the criterion in the Final Criteria and Licence 2016; hence, this would not trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Critical Capital Spares-Generation

- 5.16.8. According to JPS, the company spent US\$1.234M on programmes relating to the captioned project. For 2020, the capital budget approved for activities pertaining to this project was US\$2.738M.
- 5.16.9. JPS's expenditure is below the approved budget by US\$1.504M, which represents 54.93% of the approved budget. JPS however, stated that *"some of the planned replacements under this program[me] was deferred to 2021 due to the late approval of the new tariff by the OUR."*
- 5.16.10. The reduction in expenditure satisfies the relevant conditions of the Licence 2016 and Final Criteria; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Old Harbour - Hunts Bay 138 kV Line

- 5.16.11. According to JPS, the company spent US\$411,000 on activities relating to the captioned project. For 2020, the capital budget approved for activities pertaining to this project was US\$1.348M.
- 5.16.12. JPS's expenditure fell below the approved budget by US\$937,000, which represents 69.51% of the approved budget. JPS however, stated, *"the main item delayed is the acquisition of easement for the line route between Old Harbour and Hunts Bay"* and *"this activity is currently advanced and will be completed in 2021."*
- 5.16.13. The variation of expenditure satisfies the stated relevant requirements of the Licence 2016 and Final Criteria; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Distribution Line Structural Integrity

- 5.16.14. According to JPS, this project ran over budget and cost the company US\$5.143M. For 2020, the capital budget approved for this project was US\$4.489M.
- 5.16.15. The project cost exceeds the approved budget by US\$654,000, which represents approximately 14.57% of the approved budget. JPS however, stated that the scope of the project was expanded to increase the number of activities that were presented initially.

This, JPS indicated was required as Jamaica was exposed to major tropical storms Laura, Zeta and Eta. The storms caused flooding and landslides across several parishes and resulted in broken poles and other structures, which JPS needed to replace to ensure customers were reconnected in a timely manner after forced outages.

- 5.16.16. The OUR takes the view that there are other avenues to which JPS may have recourse to claim the excess expenditure in regard to these weather related situations. This includes distribution maintenance expenses provided for in the tariff.

Customer Growth (CCMA)

- 5.16.17. According to JPS, this project ran over budget (“overspent”), and cost the company US\$5.347M. For 2020, the capital budget approved for this project was US\$4.509M.
- 5.16.18. The project cost exceeds the approved budget by US\$838,000, which represents approximately 18.59% of the approved budget. JPS indicated that Condition 13 of the Licence 2016, mandates the company with a duty to connect customers under specified conditions, and this programme allows JPS to fulfil this mandate. In 2020, JPS stated that the company completed three hundred and thirty (330) of such new connections, which are projected to add 81,087 MWh of new demand annually going forward.
- 5.16.19. The excess in expenditure would satisfy the relevant requirements of the Final Criteria and Licence 2016, and so would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Smart Meter Programme

- 5.16.20. According to JPS, this project ran over budget (“overspent”). JPS stated that, “by the end of 2020 it had installed 69,700 Smart meters at a cost of US\$13.3M.” For 2020, the capital budget approved for this project was US\$8.667M for the installation of smart meters.
- 5.16.21. The project cost exceeds the approved budget by US\$4.546M, which represents approximately 52.39% of the approved budget. JPS indicated that its Medium Term Investment Plan budgeted US\$17.9M to install 100,000 smart meters in 2020, and it started the process of executing this scope in 2020 January. However, JPS stated that in 2020 August it received the first indication that the OUR’s approval of the project budget would be lower than requested. At that time, JPS had already overspent on the approved budget.
- 5.16.22. The excess in expenditure would satisfy the required conditions of the Final Criteria and Licence 2016 thus triggering a commensurate Z-Factor adjustment to the tariff in the following year.

Voltage Standardization Programme (VSP)

- 5.16.23. According to JPS, the company spent US\$1.988M on programmes relating to the captioned project. For 2020, the capital budget approved for activities pertaining to this project was US\$3.434M.
- 5.16.24. JPS’s expenditure fell below the approved budget by US\$1.446M, which represents 42.11% of the approved budget. JPS stated that this expenditure facilitated the upgrade

of the Upper White River feeders; however, other planned upgrades for feeders were delayed to 2021 due mainly to the impact of COVID-19 on the project roll-out.

5.16.25. The reduction in expenditure satisfies the Final Criteria and Licence 2016, hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Meters & Service Wires (Replacement and Growth)

5.16.26. According to JPS, this project ran over budget (“overspent”), and cost the company US\$2.583M. For 2020, the capital budget approved for this project was US\$2.294M.

5.16.27. The project cost exceeds the approved budget by US\$289,000, which represents approximately 12.60% of the approved budget. JPS indicated that the project executed the installation of 9,800 customer meters and build-out of 420KM of service wires across all 14 parishes. JPS stated that the programme also included the replacement of defective customer meters.

5.16.28. The excess in expenditure would satisfy the stated conditions of Condition 13(a) of the Final Criteria and the Licence 2016; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Grid Modernization Programme (FCI, DA, Trip Savers)

5.16.29. According to JPS, the company spent US\$1.402M on programmes relating to the captioned project. For 2020, the capital budget approved for activities pertaining to this project was US\$1,645M.

5.16.30. Therefore, JPS’s expenditure fell below the approved budget by US\$243,000, which represents 14.77% of the approved budget. JPS indicated that only 307 Trip Savers and 70 Fault Circuit indicators were installed. However, the project scope was intended to facilitate the installation of 200 24 kV@100A Trip Savers; 20 Distribution Automation Sectionalizers (DA Switches); 4 Pole Mounted Reclosers and 70 Fault Circuit Indicators across the distribution network. JPS further indicated that the adjustments in the installation plans were made due to the impact of COVID-19 on supply chain arrangements, but did not provide substantiating evidence of this. In addition, JPS stated that the implementation of Trip Savers in 2021 would be reduced to ensure alignment with the approved Grid modernization 5-year programme.

5.16.31. The reduction in expenditure satisfies the stated provisions of the Final Criteria and Licence 2016; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Smart Streetlight Programme

5.16.32. According to JPS, the company spent US\$5.556M on programmes relating to the captioned project. For 2020, the capital budget approved for activities pertaining to this project was US\$8.836M.

5.16.33. JPS’s expenditure fell below the approved budget by US\$3.280M, which represents 37.12% of the approved budget. JPS did not indicate the specific reasons for this level of expenditure; however, the company indicated that part of the project scope was deferred to 2021.

5.16.34. The reduction in expenditure satisfies the stated provisions of the Final Criteria and the Licence 2016; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Rami Projects

5.16.35. According to JPS, the company spent US\$667K on programmes relating to the captioned project. For 2020, the capital budget approved for activities pertaining to this project was US\$3.020M.

5.16.36. Therefore, JPS's expenditure fell below the approved budget by US\$2.353M, which represents 77.91% of the approved budget. JPS indicated that the initial plan was to upgrade the metering infrastructure in four (4) communities across Jamaica to make them theft resistant. They further indicated that the company only completed the upgrade of one (1) community in St Andrew at a cost of US\$0.67M in 2020.

5.16.37. JPS also stated that *“the roll out of projects in 2020 was hampered by the COVID-19 pandemic which disrupted the supply of key inputs such as poles, conductors and insulators and has resulted in the other three [3] community upgrades being deferred to 2021.”* While the OUR is not contesting the reasons put forward by JPS, no quantitative evidence was provided to support the JPS's position.

5.16.38. The reduction in expenditure satisfies the stated provisions of the Final Criteria and Licence 2016; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

5.17 Major Projects Z-Factor Assessment Summary

5.17.1. Table 5.7 below shows the summary of the investment performance of the Major projects for 2020 versus the approved 2020 budget.

Table 5.8 - Major Capital Project Cost vs Actuals

JPS' Update on the Major Projects (US\$'000)					
Major Capital Projects	2020 Approved	2020 Actuals	Variance		Comments
	(US\$'000)	(US\$'000)	(US\$'000)	(%)	
Combine Cycle Plant	5,514	5,788	274	4.97	No Z-Factor
Critical Capital Spares-Generation	2,738	1,234	-1,504	-54.93	Z-Factor Adj.
Old Harbour - Hunt's Bay 138 kV Line	1,348	411	-937	-69.51	Z-Factor Adj.
Distribution Line Structural Integrity *	4,489	5,143	654	14.57	Z-Factor Adj.
Customer Growth (CCMA)	4,509	5,347	838	18.59	Z-Factor Adj.
Smart Streetlight	8,836	5,556	-3,280	-37.12	Z-Factor Adj.
Voltage Standardization Program (VSP)	3,434	1,988	-1,446	-42.11	Z-Factor Adj.
Meters & Service Wires	2,294	2,583	289	12.60	Z-Factor Adj.
Grid Modernization Program	1,645	1,402	-243	-14.77	Z-Factor Adj.
Smart Meter Program	8,677	13,223	4,546	52.39	Z-Factor Adj.
Rami Projects	3,020	667	-2,353	-77.91	Z-Factor Adj.
Totals	46,504	43,342	-3,162	-6.80	Z-Factor Adj.

5.18 Minor Projects Z-Factor Assessments

Minor Projects that Recorded No Activity in 2020

- 5.18.1. According to JPS, twelve (12) projects that would fall in the category of Minor Projects did not record any activity during the year 2020. There was nothing to report on these projects, save and except that JPS asserted that these projects were deferred to 2021. For 2020, the capital budget approved for activities pertaining to these projects is US\$4.333M. Table 5.8 shows the Minor projects that, according to JPS, did not start in 2020. Therefore, given that no money was spent in relation to these projects for the year 2020, 100% of the approved budget remains.
- 5.18.2. According to Criterion 13 (b) of the Final Criteria, 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.
- 5.18.3. Based on the above requirement, the lack of expenditure satisfies the stated provisions of the Criterion 13(b), hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

Table 5.9 - Minor Projects not started in 2020

JPS' Update on Minor Projects not started in 2020 (US\$'000)				
Capital Projects	2020 Approved	2020 Actuals	Variance	
	(US\$'000)	(US\$'000)	(US\$'000)	(%)
Rockfort Major Overhaul - RF 1	422	0	-422	100
Bogue - Inlet Air Chiller Major Overhaul	504	0	-504	100
Renewables Equip. Procurement & Replacement	320	0	-320	100
Hunt's Bay - Plant Auxiliaries Rehabilitation	153	0	-153	100
Analytical software procurement & Development	302	0	-302	100
Information Technology Security Program	378	0	-378	100
Upgrade CS	196	0	-196	100
Replacement of OMS	1,126	0	-1,126	100
Unified Communications Platform	196	0	-196	100
Oracle Modification Project (Separation of Accounts)	196	0	-196	100
Funding for unforeseen projects	491	0	-491	100
Video Wall Upgrade	49	0	-49	100
Totals	4,333	0	-4,333	100

Minor Projects with expenditure under Budget

- 5.18.4. According to JPS, the company spent US\$9.331M on programmes in the Minor Projects category that started in 2020. For 2020, the capital budget approved for activities pertaining to these projects was US\$21.542M.
- 5.18.5. JPS's expenditure fell below the approved budget by US\$12.211M, which represents 56.68% of the approved budget. JPS cited challenges with late approval of the investment plan, as well as supply chain challenges due to the COVID-19 pandemic as the main factors that led to the company not executing all the minor projects as approved. JPS has indicated that for all of these projects, with one exception (Tools and Equipment), parts of their scope have been deferred to 2021.
- 5.18.6. JPS indicated that the "Tools and Equipment" project is "On budget", a reasonable interpretation of which is that the project is completed and ran 6.14% under budget.
- 5.18.7. The reduction in expenditure satisfies the stated provisions of the Final Criteria and Licence 2016; hence, this would trigger a commensurate Z-Factor adjustment to the tariff in the following year.

5.18.8. Table 5.9 below shows the Minor projects started in 2020 and budget variance relative to approved budget.

Table 5.10 - Minor Projects started in 2020

JPS' Update on Minor Projects that did not started in 2020 (US\$'000)				
Capital Projects	2020	2020	Variance	
	Approved	Actuals		
	(US\$'000)	(US\$'000)	(US\$'000)	(%)
Bogue Peaking-Plants	1,474	235	-1,239	-84.1%
Hunt's Bay - GT10 and GT 5 Hot Gas Path Inspection	688	84	-604	-87.8%
Transmission Line Structural Integrity	1,770	1,533	-237	-13.4%
Sub Station Structural Integrity	1,670	1,109	-561	-33.6%
N-1 Protection Upgrade	1,295	509	-786	-60.7%
Interbus Transformers	2,988	160	-2,828	-94.7%
Tools and Equipment	277	260	-17	-6.1%
Old Harbour 190 Grid Interconnection	166	124	-42	-25.3%
Distribution Transformers	2,798	1,467	-1,331	-47.6%
Distribution Line Reconductoring and Relocation	1,314	263	-1,051	-80.0%
Capital Spares T&D (CKT Breaker, Recloser, DA switch, etc)	448	276	-172	-38.4%
Grid Interconnection	355	77	-278	-78.3%
Electric Grid Communication Network Rehabilitation and Upgrade	1,099	825	-274	-24.9%
Expansion of Enterprise Architecture, Business Intelligence and Analytics Capability	884	61	-823	-93.1%
Business Efficiency	594	450	-144	-24.2%
Enterprise Asset Management	795	586	-209	-26.3%
IT Infrastructure Modernization	586	16	-570	-97.3%
Facilities Improvements	509	293	-216	-42.4%
Purchase of laptops, desktops, Tablets	440	440	0	0.0%
Install Charging Stations (Electric Vehicle Roll out)	582	88	-494	-84.9%
Security Cameras and Systems	250	17	-233	-93.2%
Battersea Operations Building	1,000	898	-102	-10.2%
Totals	21,542	9,331	-12,211	56.7%

Minor Projects with expenditures over Budget

5.18.9. According to JPS, these projects ran over budget (“overspent”), and cost the company US\$6.593M. The 2020 capital budget approved for these projects was US\$5.238M resulting in the project cost exceeding the approved budget by US\$1.355M, representing approximately 25.87% of the approved budget. JPS did not provide any specific details as to what caused each individual project to surpass its budgetary limit.

5.18.10. Table 5.10 below shows the Minor projects exceeding budgets and their Z-Factor status.

Table 5.11 - Capital Projects Exceeding Approved Budgets

JPS' Update on Capital Projects that over ran their Approved Budgets (US\$'000)					
Capital Projects JPS Over spend on	2020 Approved	2020 Actuals	Variance		Comments
	(US\$'000)	(US\$'000)	(US\$'000)	(%)	
Rockfort Major Overhaul - RF 2	3,377	3,551	174	5.2	Z-Factor Adj.
Renewables - Woodstave Pipeline Repairs	313	652	339	108.3	Z-Factor Adj.
Replace Pole Mounted Transformers	927	1,605	678	73.1	Z-Factor Adj.
Replace Pad mounted Transformers	210	246	36	17.1	Z-Factor Adj.
Metering Infrastructure Replacements	200	243	43	21.5	Z-Factor Adj.
Transportation Equipment	211	296	85	40.3	Z-Factor Adj.
Totals	5,238	6,593	1,355	25.9	Z-Factor Adj.

Capital Projects Z-Factor Assessment Summary

5.18.11. Based on the above findings, a commensurate Z-Factor adjustment to the tariff in 2021 is a deduction of US\$18.625M to be effected on the revenue (see Table 5.11 below).

Table 5.12 - Summary of Z-Factor Adjustments

Category	2020 Approved	2020 Actuals	Z-Factor Adj.
	(US\$'000)	(US\$'000)	(US\$'000)
Major Project	46,504	43,342	-3,436
Minor Project	31,553	16,364	-15,189
Projects that did not Start	4,333	0	-4,333
Projects that have Started	21,982	9,771	-12,211
Projects that Ran over Budget	5,238	6,593	1,355
Totals	78,057	59,706	-18,625

5.18.12. 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. The adjustments to the ROI and depreciation are shown in Table 5.12 below.

Table 5.13 - Computation of Z-Factor Adjustment for Annual Revenue Requirements

Capital Projects	Asset Life	2020 Approved CAPEX	CAPEX SPLIT		2020 Actual CAPEX	CAPEX Gap		CAPEX Over-Recovery		
			CWIP	Capital Transfer		CWIP	Capital Transfer	ROI	Depr	Total
	Years	US \$'000	%	%	US\$'000	US\$'000	US\$'000	US\$'000	US\$'000	US\$'000
Combine Cycle Plant	3	5,514	100%	0%	5,788	N/A	N/A	N/A	N/A	N/A
Critical Capital Spares-Generation	30	2,738	50%	50%	1,234	752	752	89	25	114
Old Harbour - Hunt's Bay 138 kV Line	25	1,349	100%	0%	411	938	0	111	0	111
Distribution Line Structural Integrity	30	4,489	0%	100%	5,143	N/A	N/A	N/A	N/A	N/A
Customer Growth (CCMA)	25	4,509	25%	75%	5,347	N/A	N/A	N/A	N/A	N/A
Smart Streetlight	15	8,836	0%	100%	5,556	15	3,265	2	218	219
Voltage Standardization Program (VSP)	25	3,434	100%	0%	1,988	1,446	0	172	0	172
Meters & Service Wires	20	2,294	0%	100%	2,583	N/A	N/A	N/A	N/A	N/A
Grid Modernization Program	30	1,645	0%	100%	1,402	0	243	-	8	8
Smart Meter Program	10	8,677	0%	100%	13,223	N/A	N/A	N/A	N/A	N/A
Rami Projects	10	3,020	100%	0%	667	2,353	0	279	0	279
Major Project Sub-total		46,505			43,342	5,504	4,260	653	251	904
Minor Projects	15.82	31,553	50%	50%	16,370	7,592	7,592	901	480	1,381
TOTAL		78,058			59,712	13,096	11,851	1,554	731	2,285

5.18.13. Based on the above requirements, the OUR has computed the adjustment to the revenue requirements based on its assessment of JPS's performance against the 2020 approved Capital Project budgets. Table 5.13 summarizes the Z-Factor adjustment outcome.

Table 5.14 - Computation of JPS's Capital Projects Z-Factor adjustment

Project Category	2020 OUR	2020 JPS	Capex Over - Recovery		
	Approved CAPEX	Actual Capex	ROI	Depreciation	Total
	US\$'000'	US\$'000'	US\$'000'	US\$'000'	US\$'000'
Major Project	46,505	43,342	653	251	904
Minor Project	31,553	16,370	901	480	1,381
Total US\$	78,058	59,712	1554	731	2,285
Total J\$'000'					331,346
Total adjusted for WACC (J\$'000)					370,677
Z-Factor (Capital Projects)					-0.98%

<i>Calculation Parameters</i>		
Parameter	Unit	Value
Base Exch. Rate	J\$:US\$	145.00
WACC	%	11.87%
Revenue Cap 2021	J\$'M	37,857

5.19 JPS's Z-Factor Proposal Considerations

- 5.19.1. As mentioned earlier, JPS proposed that no Z-Factor adjustment be implemented in relation to the variations between the actual capital expenditure and the OUR's approved budget for the 2020 projects (for both over and under expenditure).
- 5.19.2. JPS has also proposed that going forward, it will execute the projects approved for 2021 implementation, as well as to complete all projects deferred from 2020. Where there was overspend on projects in 2020, this will be offset against the 2021 approved amounts. Therefore, by the end of 2021, the approved expenditure for 2020 and 2021 will be expensed in total and all approved scope of work will be achieved. Additionally, JPS proposed to execute two projects, which were not submitted in the 2019-2024 Medium Term Investment Plan, which it advises became necessary after the retirement of the B6 power plant at Hunts Bay. Namely (i) 40 MVARs Bulk Capacitor Banks and (ii) GT 10 Major Overhaul.

5.20 The OUR's Position

- 5.20.1. The OUR has noted and considered the matters raised by JPS upon which it has based its proposals, and which are detailed earlier in this Determination Notice.
- 5.20.2. The OUR is mindful of the impact of the COVID-19 pandemic on electric utilities worldwide in respect of operations and projects implementation. Apart from the general statements made in its submission, JPS did not provide sufficient information to

convincingly demonstrate to the OUR, the material impact of the factors they have cited on the capital projects performance.

- 5.20.3. The OUR also finds that JPS did not provide quantitative evidence to justify the assertion that the late approval of the new tariff by the OUR, did not allow it to benefit from the intended cash flows uplift that the new tariffs should bring, and that its cash flows were suppressed by the reduction in economic activity in Jamaica, brought on by restrictions imposed to combat the spread of the COVID-19 virus.
- 5.20.4. Moreover, the OUR takes the view that the request from JPS that no Z-Factor adjustment is implemented for approved 2020 projects is inconsistent with the provisions of the Licence 2016 and Criterion 13 of the Final Criteria. The fact is that the existing regulatory framework anticipates that the revenue requirement should be consistent with investments made within a specified period and that where this is not achieved it must be taken into account in the approved rates. The OUR therefore denies JPS's request that no Z-Factor adjustments should be applied in respect of its capital projects performance.
- 5.20.5. The OUR welcomes JPS's proposal to complete all projects approved for 2021 implementation, as well as those deferred from 2020, in 2021, and its indication that by the end of 2021 the approved expenditure for 2020 and 2021 will be expensed in total and all approved scope of work will be achieved. At the same time, the OUR is cognizant that there will be a need for further engagement with JPS to fully understand the regulatory ramifications and impact on revenue requirements of this and the treatment to be accorded in the next period. The OUR therefore proposes to engage JPS in further discussion on this for the next period.
- 5.20.6. In relation to the two projects which were not submitted in the 2019-2024 Medium Term Investment Plan, namely the 40 MVARs Bulk Capacitor Banks and GT 10 Major Overhaul, the OUR gave its approval for the implementation of these projects in 2021 April.
- 5.20.7. JPS indicated that it is not requesting an incremental change to the revenue requirement to facilitate these two projects at this time, but that it will make a submission for an addition to the revenue requirement at the next annual review. The OUR takes no objection to this position at this time.
- 5.20.8. JPS submitted an alternative project that it claimed is the optimal solution that is providing the most economic benefit to customers. The alternative project is North East Coast Voltage Security Improvement Project, which includes a New 60/80 MVA Interbus transformer at Bellevue, and 30 MVAR of capacitor banks at Roaring River and Ocho Rios Substations. The proposed timeline is 15 months between 2022 January - 2023 March and the cost estimate is US\$6.1M. The business case with cost estimates as well as relevant system studies were included in the "JPS 2022 North East Coast Voltage Security Improvement Project" folder.
- 5.20.9. The OUR acknowledges receipt of the alternative project proposal and the supporting documentation. The OUR at this time, however, is not in a position to make a decision on this project in this review, given that extensive due diligence analyses are required, which are outside the scope of this annual review.

5.20.10. The OUR acknowledges JPS's indication that it is currently challenging the OUR's approach of evaluating Major projects individually, and that all projects should be evaluated collectively. As this is a matter to be addressed in another more appropriate forum, the OUR has not considered this issue in this review.

5.21 Determination Summary

- 5.21.1. In the review of the JPS's capital budget Z-Factor adjustment proposal which formed part of its Annual Filing submission, the OUR considered whether to approve JPS's request for no Z-Factor adjustments for 2021 on its capital project budget performance for 2020.
- 5.21.2. In arriving at its decision, the OUR was guided by the requirements of the Licence 2016, the Final Criteria for Z-Factor adjustments, and took into account a number of project implementation considerations submitted by JPS.
- 5.21.3. For the reasons set out earlier regarding the OUR's evaluation of JPS's proposal and the information presented in JPS's project submission, the OUR has concluded that the conditions in paragraph 46 d.(iii) of the Licence 2016 and Criterion 13 of the Final Criteria have been satisfied. Therefore, a Z-Factor adjustment should form part of the annual adjustment for 2021. The OUR is consequently constrained to deny JPS's request that no Z-Factor adjustments be applied in respect of the capital projects performance as this would be inconsistent with the provisions of the Licence 2016 and the Final Criteria.
- 5.21.4. The OUR's decision therefore is that a revenue adjustment based on a capital gap amount of US\$18.625M be deducted from the JPS's 2021 revenue requirement, in a manner in keeping with the prescribed annual revenue adjustment requirement calculation methodology.
- 5.21.5. Regarding JPS's proposal for the completion of the 2020 projects, the OUR is of the view that while it welcomes this proposal, it would require further discussions to understand the regulatory ramifications and impact on revenue requirements before the OUR can articulate a considered position with respect to this aspect of the proposal.
- 5.21.6. The OUR acknowledges receipt of the alternative project proposal - North East Coast Voltage Security Improvement Project - and the supporting documentation. The OUR is however not in a position to make a decision on this project at this time, given that extensive due diligence analyses are required, which in OUR's view, is outside the scope of this annual review.
- 5.21.7. The required Z-Factor adjustment to the annual revenue requirement, computed to include adjustments to the depreciation expenses, the approved rate of return on investments and adjusted to 2019 price levels, and the WACC surcharge, is computed at J\$370.677M.
- 5.21.8. Given that the approved revenue cap before the application of the 2021 Growth Factor is J\$37,857M, this translates to a Z-Factor adjustment -0.98%.

Determination 4

Having reviewed JPS’s performance under the Approved Capital Projects, the Office determined the following:

- A revenue adjustment based on a capital project expenditure gap of US\$18.625M shall be applied to the JPS 2021 revenue requirement in a manner consistent with the methodology for Capital Projects Z-Factor Adjustment prescribed in the Licence 2016 and Criterion 13 of the Final Criteria.
- The required Z-Factor adjustment to the annual revenue requirement, computed to include adjustments to the depreciation expenses, the approved rate of return on investments and adjusted for the WACC surcharge, is J\$ 370.677 M.
- Z-Factor adjustment expressed in relative terms shall be -0.98%.

5.22 Regulated ROE and Z-Factor Adjustment

JPS’s Proposal

- 5.22.1. JPS requested a Z-Factor adjustment to the Revenue Cap, which it claims is due to its rate of return falling outside of the band of one (1) percentage point higher or three (3) percentage points lower than the approved regulatory target as provided for under paragraph 46 (d) (ii), Schedule 3 of the Licence, 2016.
- 5.22.2. JPS explained that it has interpreted the rate of return to be the return on equity (ROE). The company indicated that Exhibit 1, Schedule 3 of the Licence 2016 makes allowance for the inclusion of an ROE to be applied when calculating the Z-Factor adjustment. Therefore, JPS contended that an adjustment would be applicable in the event the company’s ROE falls out of the determined range. Given that paragraph 1.46 of the 2019-2024 Determination Notice approved an ROE of 10.78%; JPS argued that an ROE falling below 7.78% or above 11.78% is grounds for a Z-Factor adjustment.

Computation of Z-Factor Adjustment for ROE Catch-up

- 5.22.3. JPS defined the ROE catch-up as “the United States Dollar (USD) amount required to return the regulated ROE within the prescribed allowed band (-3pp to +1pp of the ROE target).” JPS further explained that the calculated Z-factor adjustment is that minimum USD amount that, when added/subtracted to/from the regulated revenues, ensures that the ROE returns to its prescribed band.
- 5.22.4. JPS’s proposed methodology for computing the ROE Catch-Up is summarized in the following steps:
1. Compute the Regulated ROE:

$$\text{Regulated ROE} = \frac{\text{Regulatory Net Income}}{\text{Average Regulated Shareholder Equity}}$$

Where:

- **The Regulatory Net Income** is derived by:
Regulatory Revenues – Power Purchase Costs (excl. Fuel) – Net Expenses – Depreciation & Amortization – Return on Debt – Regulated Income Tax
- **Average Regulated Shareholder Equity** – is the average rate base in 2020
 * 1-Gearing ratio of 50%

2. Determine if an ROE Catch-Up is required. JPS claimed that its calculated ROE in 2020 was 5.96% and it therefore was below the lower threshold. Consequently, a positive Z-factor adjustment is warranted. The re-estimated regulated ROE of 5.96% is assessed against the ROE range. The proposed ROE catch-up is 1.82% or US\$6.1M.
3. Compute the proposed Z-Factor Adjustment:

$$\text{Proposed Z-Factor Adjustment} = \frac{\text{ROE Catch-Up}}{1 - \text{Corporate Tax Rate}}$$

5.22.5. Table 5.14 below shows the details of JPS’s proposed ROE catch-up and Z-Factor adjustment.

Table 5.15 - JPS’s Computed ROE Catch-Up and Z-Factor Adjustment

ROE Catch-UP & Z-Factor Adjustment	2020
Allowed Return on Equity	10.78%
ROE Upper Band (+1 p.p.)	11.78%
ROE Lower Band (-3 p.p.)	7.78%
Regulated ROE	5.96%
ROE Catch-up (%)	1.82%
ROE Catch-up (USD'M)	6.07
<hr/>	
Z-Factor Adjustment (USD'M)	9.11
Cost of Equity	10.78%
Z-Factor Adjustment - Including Cost of Capital (USD'M)	10.09

5.22.6. JPS’s total Z-Factor claim of 12.38% is shown in Table 5.15 below. However, the company stated that the rate of return adjustment factor was not included in its 2021 Annual Revenue Target (ART) computation, as the adjustment must be recomputed by the OUR based on the approved true-ups for the 2021 adjustment and then included.

Table 5.16 - JPS's Computed Total Z-Factor Adjustment

Z-Factor Adjustments		
	Amount (J\$)	Adjustment
2021 Revenue Cap	37,856,804,905	
Revenue Gap w/ WACC	3,221,627,733	8.51%
ROR Adjustment	1,463,655,707	3.87%
Total Z-Factor	4,685,283,440	12.38%

The OUR's Position

5.22.7. Schedule 3 paragraph 46 d. (ii) of the Licence 2016 provides as follows:

Where the Licensee's rate of return with respect to the Licensed Business is one (1) percentage point higher or three (3) percentage points lower than the approved regulatory target (after taking into consideration the allowed true-up annual adjustments, special purposed funds included in the Revenue Requirement, awards of the Tribunal and determinations of the Office and adjustments related to prior accounting periods). This adjustment may be requested by the Licensee or the Minister or may be applied by the Office."

5.22.8. The OUR accepts JPS's interpretation that the rate of return referenced in this provision is to be interpreted as the return on equity (ROE).

5.22.9. JPS's interpretation of the relevant licence provision for the rate of return Z-Factor adjustment to the Revenue Cap is that there should be an ROE catch-up, which it stated is "defined as the USD amount required to return the Regulated ROE within the prescribed allowed band (-3pp to +1pp)".

5.22.10. JPS's approach to arrive at its proposed "Regulated ROE" is not accepted.

5.22.11. For the 2019-2024 regulatory period, the Office approved the amount for the regulated ROE, which was derived from the approved rate of return (10.78%), in the 2019-2024 Determination Notice as is set out in Table 5.16 below.

Table 5.17 - Regulated ROE 2019 - 2023

Return on Equity (J\$'000')					
Year	2019	2020	2021	2022	2023
ROE (2019 Real)	4,644,732	4,735,590	4,871,437	4,990,784	5,098,502
Inflation & F/X Adj.		615,627			
Total		5,351,217			
		Gross up @13% (Inflation & F/X)			

5.22.12. Under the revenue cap regime, for any given year in the review period, JPS is allowed to recover any shortfall or refund any excess revenue, which would have resulted from a variance in volumes/sales. This adjustment takes place during the Annual Review through the revenue surcharge mechanism as provided for in the Licence 2016. JPS's ROE is therefore protected from any variance in sales/volumes.

- 5.22.13. Furthermore, JPS is entitled to an adjustment to the Revenue Cap for any FX loss/gain for the previous year taking into account the FX provisions approved in the 2019-2024 Determination Notice.
- 5.22.14. After taking into consideration the allowed true-up annual adjustments, special purpose funds included in the Revenue Requirement, awards of the Tribunal and determinations of the Office and adjustments related to prior accounting periods, the other factors that would impact JPS's ROE are as follows:
- Payments for Breaches of Guaranteed Standards
 - System Losses Adjustment (TULos₂₀₂₀)
 - Fuel Charge Adjustment for Gain/(Loss) from application of the Y-Factor
- 5.22.15. Taking into consideration the factors enumerated above, for the period under review, the OUR's computation shows that JPS would have recovered J\$1.0B above the J\$5.35B (nominal) amount approved for ROE. Therefore, the allowed one (1) percentage point higher ROE is J\$496.4M. Hence, JPS is J\$512.6M (1.03 percentage point) above the upper band of the allowed ROE. Table 5.17 below shows the details of the computation.

Table 5.18 - Computation of Allowed ROE Range and Z-Factor Adjustment Amount

Allowed Return on Equity (J\$'000')		
Allowed Rate = 10.78%		
2020 ROE 2019 Base Amount	4,735,590	
2020 Inflation & F/X Adjustment	615,627	
2020 ROE Nominal Amount	5,351,217	
Range	Gain +1%	5,847,619
		496,402
	Loss -3%	3,862,010
		(1,489,207)
Determinations of the Office and Adjustments Related to prior (2020) Accounting Period		
Payments for Breaches to Guaranteed Standards	(28,100)	
System Losses Adjustment (TULos ₂₀₂₀)	(850,595)	
Fuel Charge Gain/(Loss) from the Y-Factor	1,887,667	
Total	1,008,971	
Within Range (Yes/No)	No	
ROE(All-In) (%)	12.81	
Z-Factor Adjustment: Gain/(Loss)	512,569	
ROE Above/(Below) Range (%)	1.03	

- 5.22.16. The OUR's computation shows that the 2021 approved revenue cap should be adjusted downwards by 1.35% to account for the ROE over-recovery. JPS's proposal was for an

upward adjustment of 3.87% to the 2021 approved revenue cap. See Table 5.18 below for details of the computation.

Table 5.19 - Computation of the Z-Factor Adjustment

ROE Z-Factor Adjustment	
2021 Approved Revenue Cap (J\$)	37,856,804,905
Z-Factor Adjustment: Gain/(Loss) (J\$)	(512,568,912)
Z Factor Adjustment (%)	-1.35%

Note: 2021 Approved Revenue Cap does not include dPCI and Revenue True-up adjustments

5.22.17. In relation to the ROE Z-Factor claim, JPS argued in its submissions that:

“The main issue at hand is to clearly define how to compute JPS’s ROE for the purpose of this adjustment. In this Application, JPS proposes for the OUR’s consideration and approval, a mechanism for actual ROE computation on an annual basis to be included in the future Annual Adjustment Filing (AAF) submission.”

5.22.18. In light of the foregoing request, the OUR proposes that JPS and OUR have further discussions on a mechanism for the computation of the ROE Z-Factor adjustment. The OUR concurs that the computation, if required, shall be done on an annual basis and included in future Annual Adjustment Filings.

5.22.19. The proposed mechanism for further discussions is as follows:

1. In its computation, JPS shall use the nominal values for the approved ROE as set out in Table 11.40 of the 2019-2024 Determination Notice.
2. Taking into consideration the allowed true-up annual adjustments, special purposed funds included in the Revenue Requirement, awards of the Tribunal and determinations of the Office and adjustments related to prior accounting periods, JPS shall account for the amounts attributed to the following adjustment items:
 - Payments for Breaches to Guaranteed Standards
 - System Losses Adjustment (TULos)
 - Fuel Charge Adjustment for Gain/(Loss) from application of the Y-Factor

5.23 Special Tariff Adjustment Rate 2021

Background

5.23.1. Under ideal circumstances, the 2019-2024 Rate Review should have resulted in the new rates taking effect in 2019 August. However, this did not occur until 2020 December, owing to, among other things, the newness and complexity of the forward-looking revenue-cap regime. As a result, there were elements embedded in the tariff that were programmed to stop in 2019, but continued to be billed in the rates until 2021 January. Additionally, there was the 2019 True-up adjustment that should have been done in 2020 that had to be delayed until the new rates were introduced.

5.23.2. It was against this scenario that the OUR sought to quantify the required adjustment and include them in the new rates. As shown in Table 5.19 below, it was calculated that JPS had registered a net over-recovery of J\$1.6B and the average rate should be reduced by \$0.523 per kWh over an estimated 12-month period to off-set such over-recovery.

Table 5.20 – Summary of the 2019-2024 Tariff Adjustment

Over/Under-Recovery	J\$'000
ALRIM: Payment Over-Recovery	1,170,890
AIRIM: System Losses Adjustment	834,268
Bond Refinancing Incentive Mechanism	105,399
Decommissioning Costs	1,507,818
Total Over-recovery (JPS)	3,618,375
2018 Revenue True-up Under-recovery	3,793,803
2019 Revenue True-up	(1,779,351)
Total Under-recovery (JPS)	2,014,452
Net Over-recovery	1,603,923
Less: Expected Sum Recovered by Customers	-
Net Over-recovery Balance	1,603,923
Estimated Sales 2021 Sep - 2022 June (MWh)	3,067,886
Tariff Adjustment Rate (\$/kWh)	0.523

5.24 Review of Tariff Adjustment

- 5.24.1. In light of the fact that the new rates for the 2019-2024 regulatory period has been in effect for seven (7) months and evidence that the original calculation was overstated, the OUR has found it necessary to revise the calculation.
- 5.24.2. The overstated recovery was attributable to the higher than warranted sales statistics in the original calculation caused by the inclusion of the Caribbean Cement Company Limited (CCC) sales data in the computation. CCC purchases power from JPS under a special contract and is not subject to Rate Schedules approved by the OUR. Consequently, CCC sales, which represent roughly 3% of JPS's monthly sales, should have been omitted from the calculation.
- 5.24.3. Additionally, the calculation in the 2019-2024 Determination Notice was predicated on a base exchange rate of J\$128:US\$1, rather than the J\$145:US\$1 established. Hence, this correction was made in the current calculation.
- 5.24.4. The revised calculation of the tariff adjustment was updated to reflect the estimated payback to customers over the period 2021 February to 2021 August of the sums over-recovered at a rate of \$0.523 per kWh.
- 5.24.5. The revised and updated calculations of the required revenue over/under-recovery are discussed below.

5.25 ALRIM-2 Over-Recovery

- 5.25.1. The ALRIM-2 programme was established to incentivize JPS in its loss reduction efforts. ALRIM-2 was a two-year programme for which the delivery of benefits were programmed in two different review periods. Under the ALRIM programme, JPS was to receive US\$9.016M (net of taxes) via higher rates in phase I (2018-2019). In phase II, it was slated to receive an additional estimated sum of US\$9.016M (net of taxes) by way of a softer system losses targets in 2019-2020.
- 5.25.2. The incentive programme was based on two (2) phases over the two (2) years:
- **Phase-I:** involved the provision of US\$9.016M (or J\$1.307B) over the 2018/2019 period through the tariff to purchase smart meters to assist in reducing system losses;
 - **Phase-II:** entailed the reduction of the system losses targets from which the additional revenue would flow to JPS, based on its 2019 system losses performance at the 2019/2020 Annual Review.
- 5.25.3. As shown in Table 5.20 below, JPS over-recovered the sum of J\$1,633.8M (or US\$11.267M) under the ALRIM programme as at the end of 2021 January.

Table 5.21 – ALRIM Over-Recovery 2018 Oct – 2021 Jan

Month	Billed Sales			Approved ALRIM Factor	Exch. Rate		ALRIM Revenues				
	Billed Sales	Cement Co.	Billed Sales Excl. Cement Co.		Base	Billed	Before Fx. Adj.	After Fx. Adj.	After Fx. Adj.	After Fx & Tax Adj.	ALRIM Inflow (97.5%)
	MWh	MWh	MWh		J\$/kWh	US\$/J\$	US\$/J\$	J\$'000	J\$'000	US\$'000	US\$'000
Sep-18	261,369	6,683	254,685	0.0000	131.00	134.65	-	-	-	-	-
Oct-18	261,697	7,706	253,991	0.5702	128.00	128.59	144,829	145,363	1,130	754	735
Nov-18	254,306	5,919	248,387	0.5702	128.00	127.79	141,633	141,448	1,107	738	719
Dec-18	251,670	8,995	242,675	0.5702	128.00	127.72	138,376	138,131	1,082	721	703
Jan-19	259,411	7,358	252,052	0.5702	128.00	136.10	143,724	151,000	1,109	740	721
Feb-19	244,540	7,997	236,543	0.5702	128.00	128.81	134,880	135,560	1,052	702	684
Mar-19	265,563	8,014	257,549	0.5702	128.00	126.47	146,858	145,450	1,150	767	748
Apr-19	258,430	7,268	251,162	0.5702	128.00	134.96	143,216	149,446	1,107	738	720
May-19	280,987	8,065	272,921	0.5702	128.00	132.82	155,623	160,312	1,207	805	785
Jun-19	277,492	8,053	269,439	0.5702	128.00	136.06	153,637	161,380	1,186	791	771
Jul-19	298,629	8,377	290,253	0.5702	128.00	136.63	165,506	174,434	1,277	851	830
Aug-19	286,235	6,653	279,582	0.5702	128.00	136.70	159,421	168,087	1,230	820	799
Sep-19	281,076	7,425	273,651	0.5702	128.00	135.16	156,039	163,021	1,206	804	784
Oct-19	281,392	6,316	275,075	0.5702	128.00	140.12	156,852	168,735	1,204	803	783
Nov-19	268,665	6,963	261,701	0.5702	128.00	135.82	149,225	156,519	1,152	768	749
Dec-19	273,512	8,183	265,330	0.5702	128.00	132.57	151,294	155,616	1,174	783	763
Jan-20	269,367	8,290	261,078	0.5702	128.00	141.22	148,870	161,170	1,141	761	742
Feb-20	254,699	7,091	247,607	0.5702	128.00	137.00	141,189	149,131	1,089	726	708
Mar-20	255,554	7,540	248,014	0.5702	128.00	135.39	141,421	147,953	1,093	729	710
Apr-20	241,179	7,393	233,786	0.5702	128.00	142.95	133,308	145,763	1,020	680	663
May-20	241,392	8,466	232,926	0.5702	128.00	143.49	132,817	145,676	1,015	677	660
Jun-20	249,807	9,732	240,075	0.5702	128.00	140.01	136,894	147,170	1,051	701	683
Jul-20	270,938	9,829	261,109	0.5702	128.00	148.01	148,888	167,508	1,132	754	736
Aug-20	266,523	9,003	257,520	0.5702	128.00	149.29	146,841	166,380	1,114	743	724
Sep-20	256,500	9,613	246,887	0.5702	128.00	142.10	140,778	153,184	1,078	719	701
Oct-20	251,957	8,260	243,697	0.5702	128.00	145.20	138,959	153,897	1,060	707	689
Nov-20	239,865	9,185	230,680	0.5702	128.00	146.78	131,537	146,976	1,001	668	651
Dec-20	244,868	9,330	235,539	0.5702	128.00	142.65	134,307	146,605	1,028	685	668
Jan-21	242,623	9,334	233,289	0.5702	128.00	149.61	133,024	150,991	1,009	673	656
Oct-18 to Sep-19	3,220,036	91,831	3,128,205				1,783,742	1,833,630	13,844	9,229	8,998
Oct-18 to Jan-21	7,328,876	226,360	7,102,517				4,049,945	4,296,902	31,205	20,803	20,283
Approved Recovery (after tax) US\$'000											9,016
										Over-recovery (US\$'000)	11,267
										Over-recovery (J\$'000)	1,633,769

Calculation Parameters

Parameter/Variable	Unit	Value
Approved ALRIM Rev. (before tax)	US\$M	13.87
	J\$M	1,775.36
2018 Sales Target	MWh	3,113,505
ALRIM Rate	J\$/kWh	0.5702
Collection Factor	%	97.5%
Old Base Exch. Rate	J\$/US\$	128.00
New Base Exch. Rate	J\$/US\$	145.00

5.26 ALRIM-2 System Losses Adjustment

- 5.26.1. Consistent with the system losses component of the ALRIM-2 programme, the 2019-2020 Rate Review calculation was revised to reflect the actual System losses registered in 2019.

Table 5.22 – ALRIM System Losses Adjustment 2019

Variables	Unit	Target	Actual	Variance	Responsibility Factor (RF)	Applicable Adjustment Factor	Value (J\$)
ART ₂₀₁₉	\$						48,863,083,638
TL	%	8.00%	7.92%	0.08%	1.0	0.08%	39,090,467
JNTL	%	5.75%	6.02%	-0.27%	1.0	-0.27%	(131,930,326)
GNTL	%	9.70%	12.11%	-2.41%	0.2	-0.48%	(235,520,063)
System Losses	\$						(328,359,922)
WACC (pre-tax) @ 13.22%	\$						(43,409,182)
Total Adjustment	\$						(371,769,104)

- 5.26.2. As shown in Table 5.21 above, the amount owing to customers arising from JPS's System losses performance under the ALRIM-2 programme is J\$371.8M.

5.27 Refinancing Incentive Mechanism

- 5.27.1. In the 2018 Annual and Extraordinary Rate Review, JPS was allowed to recover net refinancing costs amounting to US\$5.312M. This refinancing cost was intended to secure a bond that would be used to replace US\$179.19M of relatively more expensive long-term debt in its portfolio. However, the introduction of new tariffs in 2021 January has led to the over-recovery of J\$178.3M (or US\$1.229M). This is shown in Table 5.22 below.

Table 5.23 – Refinancing Incentive Mechanism Adjustment

Month	Billed Sales Cement Co.	Cement Co.	Billed Sales Excluding Cement Co.	Approved Unit Refinancing Cost	Exch. Rate		Refinancing Revenues				
					Base	Billed	Before Fx. Adj	After Fx. Adj	After Fx. Adj.	After Fx & Tax Adj.	Net Inflows (97.5%)
					US\$/J\$	US\$/J\$	J\$'000	J\$'000	US\$'000	US\$'000	US\$'000
Sep-18	261,369	6,683	254,685	0.1094	131.00	134.65	27,851	28,472	211.45	140.97	137.44
Oct-18	261,697	7,706	253,991	0.1094	128.00	128.59	27,775	27,878	216.80	144.53	140.92
Nov-18	254,306	5,919	248,387	0.1094	128.00	127.79	27,163	27,127	212.28	141.52	137.98
Dec-18	251,670	8,995	242,675	0.1094	128.00	127.72	26,538	26,491	207.42	138.28	134.82
Jan-19	259,411	7,358	252,052	0.1094	128.00	136.10	27,563	28,959	212.78	141.85	138.30
Feb-19	244,540	7,997	236,543	0.1094	128.00	128.81	25,867	25,998	201.84	134.56	131.19
Mar-19	265,563	8,014	257,549	0.1094	128.00	126.47	28,164	27,895	220.57	147.05	143.37
Apr-19	258,430	7,268	251,162	0.1094	128.00	134.96	27,466	28,661	212.36	141.58	138.04
May-19	280,987	8,065	272,921	0.1094	128.00	132.82	29,846	30,745	231.48	154.32	150.46
Jun-19	277,492	8,053	269,439	0.1094	128.00	136.06	29,465	30,950	227.46	151.64	147.85
Jul-19	298,629	8,377	290,253	0.1094	128.00	136.63	31,741	33,453	244.84	163.23	159.15
Aug-19	286,235	6,653	279,582	0.1094	128.00	136.70	30,574	32,236	235.82	157.21	153.28
Sep-19	281,076	7,425	273,651	0.1094	128.00	135.16	29,925	31,264	231.32	154.21	150.35
Oct-19	281,392	6,316	275,075	0.1094	128.00	140.12	30,081	32,360	230.94	153.96	150.11
Nov-19	268,665	6,963	261,701	0.1094	128.00	135.82	28,619	30,017	221.01	147.34	143.66
Dec-19	273,512	8,183	265,330	0.1094	128.00	132.57	29,015	29,844	225.12	150.08	146.33
Jan-20	269,367	8,290	261,078	0.1094	128.00	141.22	28,550	30,909	218.87	145.92	142.27
Feb-20	254,699	7,091	247,607	0.1094	128.00	137.00	27,077	28,600	208.76	139.17	135.70
Mar-20	255,554	7,540	248,014	0.1094	128.00	135.39	27,122	28,374	209.58	139.72	136.22
Apr-20	241,179	7,393	233,786	0.1094	128.00	142.95	25,566	27,955	195.56	130.37	127.11
May-20	241,392	8,466	232,926	0.1094	128.00	143.49	25,472	27,938	194.70	129.80	126.56
Jun-20	249,807	9,732	240,075	0.1094	128.00	140.01	26,254	28,224	201.59	134.39	131.03
Jul-20	270,938	9,829	261,109	0.1094	128.00	148.01	28,554	32,125	217.05	144.70	141.08
Aug-20	266,523	9,003	257,520	0.1094	128.00	149.29	28,161	31,909	213.74	142.49	138.93
Sep-20	256,500	9,613	246,887	0.1094	128.00	142.10	26,999	29,378	206.74	137.83	134.38
Oct-20	251,957	8,260	243,697	0.1094	128.00	145.20	26,650	29,515	203.27	135.51	132.12
Nov-20	239,865	9,185	230,680	0.1094	128.00	146.78	25,226	28,187	192.04	128.02	124.82
Dec-20	244,868	9,330	235,539	0.1094	128.00	142.65	25,758	28,116	197.10	131.40	128.11
Jan-21	242,623	9,334	233,289	0.1094	128.00	149.61	25,512	28,957	193.55	129.03	125.81
Oct-18 to Sep-19	3,220,036	91,831	3,128,205				342,088	351,655	2,654.96	1,769.97	1,725.72
Oct-18 to Jan-21	7,328,876	226,360	7,102,517				776,702	824,063	5,984.56	3,989.70	3,889.96
Approved Recovery											2,660.00
									Over-recovery (US\$'000)		1,229.96
									Over-recovery (J\$'000)		178,344.40

Calculation Parameters

Parameter/Variable	Unit	Value
Approved RIM Rev.	US\$M	2.66
	J\$M	340.48
2018 Sales Target	MWh	3,113,505
Refinancing Rate	J\$/kWh	0.1094
Collection Factor	%	97.5%
Base Exch. Rate	J\$/US\$	128.00
New Base Exch. Rate	J\$/US\$	145.00

5.28 Decommissioning Adjustments

5.28.1. In the 2018 Annual and Extraordinary Rate Review, JPS was allowed to recover additional costs associated with the decommissioning of the Old Harbour Power Station and the Hunts Bay B6 generation plant. The approved recovery was as follows:

- Prior accelerated depreciation (Z-Factor) – US\$1.52M
- Projected accelerated depreciation – US\$6.42M
- Separation costs – US\$2.32M

5.28.2. As shown in Table 5.23 below, the revised over-recovered sum of all three decommissioning costs amounted to J\$1.860B (or US\$12.829M).

Table 5.24 - Over-recovered Revenues from Approved Decommissioning Costs

Month	Billed Sales			Adjustment Factor			Exch. Rate		Adjustment Revenue (J\$)				
	Billed Sales	Cement Co.	Billed Sales Excluding Cement Co.	Z-Factor	Accelerated Depreciation	Seperation Cost	Base	Billed	Z-Factor	Accelerated Depreciation	Seperation Cost	Total	Total
	MWh	MWh	MWh	J\$/kWh	J\$/kWh	J\$/kWh	US\$/J\$	US\$/J\$	J\$'000	J\$'000	J\$'000	J\$'000	US\$'000
Sep-18	261,369	6,683	254,685				131.00	134.65	-				
Oct-18	261,697	7,706	253,991	0.0627	0.2640	0.0953	128.00	128.59	15,973	67,306	24,294	107,572	836.6
Nov-18	254,306	5,919	248,387	0.0627	0.2640	0.0953	128.00	127.79	15,543	65,493	23,639	104,675	819.1
Dec-18	251,670	8,995	242,675	0.0627	0.2640	0.0953	128.00	127.72	15,178	63,957	23,085	102,221	800.4
Jan-19	259,411	7,358	252,052	0.0627	0.2640	0.0953	128.00	136.10	16,592	69,916	25,236	111,744	821.0
Feb-19	244,540	7,997	236,543	0.0627	0.2640	0.0953	128.00	128.81	14,896	62,767	22,655	100,318	778.8
Mar-19	265,563	8,014	257,549	0.0627	0.2640	0.0953	128.00	126.47	15,983	67,346	24,308	107,637	851.1
Apr-19	258,430	7,268	251,162	0.0627	0.2640	0.0953	128.00	134.96	16,422	69,196	24,976	110,594	819.5
May-19	280,987	8,065	272,921	0.0627	0.2640	0.0953	128.00	132.82	17,616	74,228	26,792	118,635	893.2
Jun-19	277,492	8,053	269,439	0.0627	0.2640	0.0953	128.00	136.06	17,733	74,722	26,970	119,425	877.7
Jul-19	298,629	8,377	290,253	0.0627	0.2640	0.0953	128.00	136.63	19,168	80,766	29,152	129,086	944.8
Aug-19	286,235	6,653	279,582	0.0627	0.2640	0.0953	128.00	136.70	18,470	77,827	28,091	124,389	910.0
Sep-19	281,076	7,425	273,651	0.0627	0.2640	0.0953	128.00	135.16	17,913	75,482	27,245	120,640	892.6
Oct-19	281,392	6,316	275,075	0.0627	0.2640	0.0953	128.00	140.12	18,541	78,127	28,199	124,868	891.1
Nov-19	268,665	6,963	261,701	0.0627	0.2640	0.0953	128.00	135.82	17,199	72,471	26,158	115,828	852.8
Dec-19	273,512	8,183	265,330	0.0627	0.2640	0.0953	128.00	132.57	17,100	72,053	26,007	115,160	868.7
Jan-20	269,367	8,290	261,078	0.0627	0.2640	0.0953	128.00	141.22	17,710	74,625	26,935	119,270	844.6
Feb-20	254,699	7,091	247,607	0.0627	0.2640	0.0953	128.00	137.00	16,387	69,050	24,923	110,361	805.6
Mar-20	255,554	7,540	248,014	0.0627	0.2640	0.0953	128.00	135.39	16,258	68,505	24,726	109,489	808.7
Apr-20	241,179	7,393	233,786	0.0627	0.2640	0.0953	128.00	142.95	16,017	67,491	24,360	107,869	754.6
May-20	241,392	8,466	232,926	0.0627	0.2640	0.0953	128.00	143.49	16,007	67,451	24,346	107,804	751.3
Jun-20	249,807	9,732	240,075	0.0627	0.2640	0.0953	128.00	140.01	16,172	68,142	24,595	108,910	777.9
Jul-20	270,938	9,829	261,109	0.0627	0.2640	0.0953	128.00	148.01	18,407	77,559	27,995	123,961	837.5
Aug-20	266,523	9,003	257,520	0.0627	0.2640	0.0953	128.00	149.29	18,283	77,037	27,806	123,126	824.7
Sep-20	256,500	9,613	246,887	0.0627	0.2640	0.0953	128.00	142.10	16,833	70,927	25,601	113,360	797.7
Oct-20	251,957	8,260	243,697	0.0627	0.2640	0.0953	128.00	145.20	16,911	71,257	25,720	113,888	784.4
Nov-20	239,865	9,185	230,680	0.0627	0.2640	0.0953	128.00	146.78	16,150	68,053	24,563	108,766	741.0
Dec-20	244,868	9,330	235,539	0.0627	0.2640	0.0953	128.00	142.65	16,110	67,881	24,501	108,491	760.5
Jan-21	242,623	9,334	233,289	0.0627	0.2640	0.0953	128.00	149.61	16,592	69,912	25,234	111,737	746.9
Oct-18 to Sep-19	3,220,036	91,831	3,128,205						201,487	849,006	306,442	1,356,936	10,244.7
Oct-18 to Jan 21	7,328,876	226,360	7,102,517						472,163	1,989,549	718,112	3,179,824	23,092.7
Approved Recovery									195,084	822,026	296,704	1,313,814	10,264.2
												Over-recovery (US\$'000)	12,828.5
												Over-recovery (J\$'000)	1,860,133.3

Calculation Parameters

	Unit	Z-Factor	Accelerated Depreciation	Seperation Cost
Approved Amount	US\$M	1.52	6.422078	2.32
	J\$M	195.08	822.03	296.70
2018 Sales Target	MWh	3,113,505	3,113,505	3,113,505
Adjustment Rate	J\$/kWh	0.0627	0.2640	0.0953
Old Base Exch. Rate	J\$/US\$	128.00	128.00	128.00
New Base Exch. Rate	J\$/US\$	145.00	145.00	145.00

5.29 2018 True-Up Adjustment

5.29.1. In the 2019-2024 Determination Notice, the Office determined that given the delay in the implementation of the results from the 2019-2024 Rate Review, the 2018 Revenue true-up embedded in the tariff went beyond the intended J\$3,305.6M (or US\$25.825M) and over-compensated JPS's customers in the amount of J\$4,680.3M (or US\$32.3M).

5.29.2. The 2019-2024 Rate Review calculation only considered the period 2018 October to 2020 September. However, the OUR has updated this calculation to reflect the fact that the old tariff was in effect until 2021 January. Accordingly, as shown in Table 5.24 below, the over-compensation to JPS's customers over the period amounted to J\$4,680.3M.

Table 5.25 - Under-recovered Revenues from the 2018 True-Up

Month	Billed Sales	Cement Co.	Billed Sales Excluding Cement Co.	Approved Unit Volumetric Adj.	Exch. Rate		True-up Revenues		
					Base	Billed	Before Fx. Adj.	After Fx. Adj	After Fx. Adj
					US\$/J\$	US\$/J\$	J\$'000	J\$'000	US\$'000
	MWh	MWh	MWh	J\$/kWh	US\$/J\$	US\$/J\$	J\$'000	J\$'000	US\$'000
Sep-18	261,369	6,683	254,685		131.00	134.65	-	-	
Oct-18	261,697	7,706	253,991	(1.0617)	128.00	128.59	(269,667)	(270,662)	(2,104.84)
Nov-18	254,306	5,919	248,387	(1.0617)	128.00	127.79	(263,718)	(263,372)	(2,060.97)
Dec-18	251,670	8,995	242,675	(1.0617)	128.00	127.72	(257,653)	(257,196)	(2,013.81)
Jan-19	259,411	7,358	252,052	(1.0617)	128.00	136.10	(267,609)	(281,157)	(2,065.81)
Feb-19	244,540	7,997	236,543	(1.0617)	128.00	128.81	(251,143)	(252,409)	(1,959.60)
Mar-19	265,563	8,014	257,549	(1.0617)	128.00	126.47	(273,445)	(270,824)	(2,141.47)
Apr-19	258,430	7,268	251,162	(1.0617)	128.00	134.96	(266,664)	(278,265)	(2,061.82)
May-19	280,987	8,065	272,921	(1.0617)	128.00	132.82	(289,767)	(298,497)	(2,247.37)
Jun-19	277,492	8,053	269,439	(1.0617)	128.00	136.06	(286,069)	(300,485)	(2,208.43)
Jul-19	298,629	8,377	290,253	(1.0617)	128.00	136.63	(308,168)	(324,791)	(2,377.14)
Aug-19	286,235	6,653	279,582	(1.0617)	128.00	136.70	(296,838)	(312,973)	(2,289.54)
Sep-19	281,076	7,425	273,651	(1.0617)	128.00	135.16	(290,541)	(303,541)	(2,245.81)
Oct-19	281,392	6,316	275,075	(1.0617)	128.00	140.12	(292,053)	(314,179)	(2,242.19)
Nov-19	268,665	6,963	261,701	(1.0617)	128.00	135.82	(277,854)	(291,434)	(2,145.74)
Dec-19	273,512	8,183	265,330	(1.0617)	128.00	132.57	(281,706)	(289,752)	(2,185.66)
Jan-20	269,367	8,290	261,078	(1.0617)	128.00	141.22	(277,192)	(300,095)	(2,125.01)
Feb-20	254,699	7,091	247,607	(1.0617)	128.00	137.00	(262,890)	(277,677)	(2,026.84)
Mar-20	255,554	7,540	248,014	(1.0617)	128.00	135.39	(263,322)	(275,484)	(2,034.74)
Apr-20	241,179	7,393	233,786	(1.0617)	128.00	142.95	(248,215)	(271,408)	(1,898.62)
May-20	241,392	8,466	232,926	(1.0617)	128.00	143.49	(247,302)	(271,244)	(1,890.33)
Jun-20	249,807	9,732	240,075	(1.0617)	128.00	140.01	(254,893)	(274,026)	(1,957.19)
Jul-20	270,938	9,829	261,109	(1.0617)	128.00	148.01	(277,225)	(311,896)	(2,107.26)
Aug-20	266,523	9,003	257,520	(1.0617)	128.00	149.29	(273,414)	(309,796)	(2,075.13)
Sep-20	256,500	9,613	246,887	(1.0617)	128.00	142.10	(262,125)	(285,225)	(2,007.21)
Oct-20	251,957	8,260	243,697	(1.0617)	128.00	145.20	(258,738)	(286,552)	(1,973.50)
Nov-20	239,865	9,185	230,680	(1.0617)	128.00	146.78	(244,918)	(273,665)	(1,864.46)
Dec-20	244,868	9,330	235,539	(1.0617)	128.00	142.65	(250,076)	(272,974)	(1,913.59)
Jan-21	242,623	9,334	233,289	(1.0617)	128.00	149.61	(247,688)	(281,141)	(1,879.16)
Oct-18 to Sep-19	3,220,036	91,831	3,128,205				(3,321,282)	(3,414,172)	(25,776.61)
Oct-18 to Jan-21	7,328,876	226,360	7,102,517				(7,540,893)	(8,000,720)	(58,103.24)
Approved Recovery								(3,305,674)	(25,825.58)
							Over-Recovery (US\$'000)		(32,277.66)
							Over-Recovery (J\$'000)		(4,680,261.16)

Calculation Parameters

Parameter/Variable	Unit	Value
Approved True-up Rev.	US\$M	(25.83)
	J\$M	(3,305.67)
2018 Sales Target	MWh	3,113,505
Volumetric Adj. Rate	J\$/kWh	(1.0617)
Base Exch. Rate	J\$/US\$	128.00
Base Exch. Rate	J\$/US\$	145.00

5.30 2019 True-Up Adjustment

- 5.30.1. Based on JPS's 2018 performance, in the 2019-2024 Determination Notice, the Office determined that the overall revenue requirement should be adjusted downwards by J\$1,779.4M. This amount has not changed in the revised calculation.

5.31 Special Tariff Adjustment Recovery 2021

- 5.31.1. With the implementation of the new 2019- 2024 rates in 2021 February, rate-payers recovered a total of J\$622.5M from JPS via a \$0.523 per kWh reduction in rate.
- 5.31.2. The 2021 Annual Review will result in a revision of JPS's rates that will take effect in 2021 September. Consequently, the OUR extrapolated the 5-month recovery for a 7-month period ending 2021 August. Based on this approach, customers are expected to recover a total of J\$877.6M from the initially calculated sum of J\$1,603.9M in the 2019-2024 Determination Notice. Therefore, the amount owing to customers by JPS in the revised and updated over-recovery calculation must be reduced by the estimated J\$877.6M.

Table 5.26 - Actual and Estimated Recovery of Revenues by Customers

Rate Class	Actual (2021 Feb to Jun)		Estimated (2021 Feb to Jun)	
	Sales (MWH)	Customer Recovery (\$'000)	Sales (MWH)	Customer Recovery (\$'000)
Rate 10	446,527	233,491	625,137	326,828
Rate 20	219,653	113,989	307,514	160,771
Rate 40	305,882	158,333	428,235	223,886
Rate 50	91,392	45,793	127,948	66,893
Rate 60	20,605	10,780	28,846	15,081
Rate 70	114,892	60,088	160,848	84,093
Total	1,198,950	622,474	1,678,529	877,552

5.32 Over-Recovery/Under-Recovery Outcome

- 5.32.1. As shown in Table 5.26 below, the summation of the amounts over-recovered by JPS arising from the 2018 Annual and Extra-ordinary Rate Review decisions is J\$4,044.0M. On the other hand, the total under-recovery by JPS arising from the 2018 and 2019 true-up calculation is J\$2,900.9M.
- 5.32.2. Consequently, the net over-recovery by JPS is J\$1,143.1M. When this is reduced by the expected sum recovered by customers (i.e. J \$877.5 M, Table 5.25 above), the balance owing to customers is J\$265.6M.
- 5.32.3. In keeping with the treatment given to other components of the PBRM, the effect of WACC is taken into account. As a result, the balance owing to customers inclusive of WACC is J\$297.1M

- 5.32.4. The OUR estimates that for the 10-month period leading up to the 2022 Annual Review, sales excluding CCC's special contract usage will be 2,618,818MWh. In this regard, a downward adjustment to JPS's rates of \$0.113 per kWh over a ten-month billing period should clear the balance of J\$297.1M due to JPS's customers.
- 5.32.5. Notwithstanding, should JPS's programmed payout of \$0.113 per kWh results in a full payout of the J\$297.1M prior to the implementation of the next Annual Review Determination Notice, the company shall be entitled to cease such payment and notify the OUR within 30 days of this cessation. This notification should be accompanied by evidence demonstrating a complete reconciliation of the balance.

Table 5.27 – Summary of the Tariff Adjustment (2021 Sep – 2022 Jun)

Over/Under-Recovery	J\$'000
ALRIM: Payment Over-Recovery	1,633,769
AIRIM: System Losses Adjustment	371,769
Bond Refinancing Incentive Mechanism	178,344
Decommissioning Costs	1,860,133
Total Over-recovery (JPS)	4,044,015
2018 Revenue True-up Under-recovery	4,680,261
2019 Revenue True-up	(1,779,351)
Total Under-recovery (JPS)	2,900,910
Net Over-recovery	1,143,105
Less: Expected Sum Recovered by Customers	877,552
Net Over-recovery Balance	265,553
WACC (11.87%)	31,521
Net Over-recovery Balance (incl. WACC)	297,074
Estimated Sales 2021 Sep - 2022 June (MWh)	2,618,818
Tariff Adjustment Rate (\$/kWh)	0.113

Determination 5

The Office has determined that there is a net over-recovery balance (including WACC) owed by JPS with respect to the decisions in the 2018 Annual & Extraordinary Rate Review Determination Notice and the implementation of the 2019-2024 Determination Notice in 2021 February.

Accordingly, the net over-recovered balance deemed to be owing to customers is J\$297.1M. JPS shall therefore apply a reduction of J\$0.113 per kWh to its average Non-fuel tariff over the 10-month billing period leading up to the implementation of the 2022 Annual Review Determination Notice, which the Office envisages will be a sufficient period to effect this payout to customers. In the event that JPS completes this payout of J\$297.1M prior to the Annual Review Determination Notice, it shall be entitled to cease the application of this reduction to the average Non-fuel tariff and notify the OUR within 30 days of this cessation accompanying the notice of this cessation with evidence of full reconciliation of payments.

6.0 Tariff Design

6.1 Rate 10 and Rate 20 TOU Rates

- 6.1.1. In its 2019-2024 Rate Review Application, JPS proposed the introduction of a time-of-use (TOU) rate option for residential (RT10) customers. The design proposed was based upon the concept of a ratcheted demand charge and an energy charge that would vary with kWh consumption. In response, the OUR took the view that it was “a positive step toward greater cost reflectivity” and approved the establishment of RT10 TOU rates.
- 6.1.2. In addition, the OUR took the position that there would be merit in extending a similar option to small commercial & industrial (RT20) customers. Consequently, approval was also given for the introduction of a RT20 TOU category within the tariff framework.
- 6.1.3. Notwithstanding the approval given, the OUR limited the structure of the TOU design to the energy rate. In principle, a demand charge can be cost-reflective and modern meters are capable of recording monthly maximum demand alongside TOU energy charges. However, this rate formulation, particularly the ratchet type demand charge, imposes a level of complexity that the typical residential customer is likely to find undesirable. This explains why across regulatory jurisdictions, demand charge is not usually a feature of residential TOU rates.
- 6.1.4. Although the OUR would not normally consider matters relating to tariff design at an Annual Review, in recognition of the complexities involved in the implementation of 2019-2024 tariff design, as an exception, the OUR in the 2019-2024 Determination Notice and Addendum, offered to address the tariff design issues at the 2021 Annual Review. Following the publication of the 2019-2024 Determination Notice and Addendum, JPS, by way of a letter dated 2021 February 8, expressed concerns that the RT10 TOU design contained weaknesses that would put the company at risk of revenue losses. This risk arose primarily because the design as rendered in the Determination Notice would facilitate a migration of customers from the RT10 Standard to the TOU category by dint of the rate arbitrage opportunity created by the weakness in the construct. It should be noted that JPS has appealed elements of the TOU tariff as determined by the OUR to the Electricity Appeals Tribunal.
- 6.1.5. The OUR in response, acknowledged the design flaw in the TOU and the associated risk of revenue loss, but did not consider it unfixable. Notwithstanding the Tribunal appeal, JPS and the OUR commenced a collaboration through dialogue and data exchange to address the design weakness in the TOU rates before the submission of JPS’s 2021 Annual Review application.

6.2 JPS’s Application

- 6.2.1. The salient benefit of TOU rates were identified by JPS in its application. JPS stated that if properly executed, TOU rates have the “potential to significantly transform the way households and businesses utilize energy.” The price signalling capability inherent in TOU rates communicate the cost of service at various times of day, thus incentivizing customers to modify “their consumption patterns to realize savings on their electricity bills.”
- 6.2.2. In addressing the issue of the TOU rates, JPS indicated that three factors should be taken into consideration. First, that the revised design should not lead to the company’s financial

haemorrhaging, as would have been the case had the TOU rates in the 2019-2024 Rate Review been implemented.

- 6.2.3. Secondly, the company called for the establishment of “an appropriate eligibility criteria that would be targeted towards households and businesses most likely to benefit from the TOU tariff by shifting their load.”
- 6.2.4. Thirdly, JPS expressed concern as to the treatment of the general consumption tax (GCT) in relation to the RT10 customer class. Currently, GCT is only applied to the energy usage above 150kWh. For standard users, kWhs are homogenous and therefore it presents no computational challenges. On the other hand, it is problematic for TOU consumption because it falls in three buckets (On-peak, Partial-peak and Off-peak), and there is no way of saying which kWh in what bucket was used first by the consumer. Consequently, the tax paid by consumers is tied to how the accumulation of kWhs are conceived.

6.3 OUR's Analysis

- 6.3.1. The TOU design approved by the OUR had the following features:
 1. It was derived from the average base energy rate for the given customer class;
 2. It assumed that the average daily usage of electricity is distributed between On-Peak, Partial Peak and Off-Peak periods in the ratio 17%: 50%: 33%;
 3. The calculation was based on an estimated ratio of the TOU to the standard price for the relevant rate class.
- 6.3.2. The application of these assumptions, particularly in the case of the RT10 category, exposed JPS to revenue losses. The analysis below sets out the approach employed to remedy the problem based on the rates issued in the 2019-2024 Determination Notice.

6.4 Rate 10 TOU

- 6.4.1. The OUR's analysis indicated that under the RT10 TOU rates approved in the 2019-2024 Determination Notice, JPS could lose between approximately \$420 and \$8,400 per month from every customer that consumed in excess of 200 kWh and below 1,000 kWh. These customers would not have to change their consumption behavior in order to reap this windfall.
- 6.4.2. In resolving the problem, the OUR applied the following adjustments:
 1. LRMC analysis from the 2019-2024 Determination Notice was used to determine the price relationship across TOU periods;
 2. The referenced energy price for the RT10 Standard rate was derived from the average RT10 energy rate (i.e. J\$12.20 per kWh) and the Non-lifeline rate (i.e. J\$20.61 per kWh). The reference energy rate was therefore J\$16.40 per kWh;
 3. The average daily usage of electricity is distributed between On-peak, Partial peak and Off-peak periods in the ratio 13.8%: 50.2%: 36%. This reflects the consumption distribution presented by JPS in relation to its RT10 load curve.

6.5 Old Methodology

6.5.1. Table 6.1 below shows the simulation of the TOU rates based on original methodology and billing data for 2020 February⁴. The simulation captures the effect of simultaneous “peak-shaving” and “valley-filling.” Simultaneous “peak-shaving” and “valley-filling” mean that energy consumption during the On-peak period is reduced and consumption in the Off-peak period is increased by the same number of kWh.

**Table 6.1 - Monthly Savings on RT10 Bill Caused by Switching to TOU Rates
(Based on Original Methodology and includes GCT)**

Consumption	2019 - 2024 Determination				
	No Change	10% Pk-Reduction	25% Pk-Reduction	33.3% Pk-Reduction	50% Pk-Reduction
	\$	\$	\$	\$	\$
90	(454.61)	(446.01)	(433.10)	(425.95)	(411.58)
100	(505.13)	(495.56)	(481.22)	(473.28)	(457.31)
150	(67.03)	(52.69)	(31.17)	(19.26)	4.69
200	420.04	440.12	470.25	486.92	520.45
250	914.29	939.39	977.04	997.88	1,039.80
300	1,408.53	1,438.66	1,483.84	1,508.84	1,559.15
350	1,902.78	1,937.92	1,990.64	2,019.81	2,078.50
400	2,397.02	2,437.19	2,497.44	2,533.95	2,607.41
450	2,891.27	2,940.76	3,014.99	3,056.07	3,138.71
500	3,395.08	3,450.07	3,532.55	3,578.19	3,670.01
550	3,898.89	3,959.37	4,050.10	4,100.31	4,201.32
600	4,402.70	4,468.68	4,567.66	4,622.43	4,732.62
650	4,906.51	4,977.99	5,085.21	5,144.54	5,263.92
700	5,410.31	5,487.30	5,602.77	5,666.66	5,795.22
750	5,914.12	5,996.60	6,120.32	6,188.78	6,326.53
800	6,417.93	6,505.91	6,637.88	6,710.90	6,857.83
850	6,921.74	7,015.22	7,155.44	7,233.02	7,389.13
900	7,425.55	7,524.53	7,672.99	7,755.14	7,920.43
950	7,929.36	8,033.83	8,190.55	8,277.26	8,451.74
1,000	8,433.17	8,543.14	8,708.10	8,799.38	8,983.04

6.5.2. The simulation shows that for RT10 customers with a consumption of approximately 157 kWh per month and above, there would be a reduction in their bill by simply switching from the Standard rate to the TOU option. On the other hand, customers below approximately 157 kWh monthly would experience increases in their bills, if they switched to the TOU option and make no change to their consumption behavior.

⁴ 2020 February billing data was used because that was the month in which the 2019-2024 Determination Notice was implemented.

6.5.3. Further, for customers with consumption of 100 kWh and below, even if they transferred 50% of their On-peak consumption to the Off-peak period, they would still see bill increases in excess of \$450 per month.

6.6 New Methodology

6.6.1. As pointed out before, the new methodology relied on the LRMC and the latest load curve process, which involves two steps. The first was to apply the LRMC without any rationalization of the results. The outcome is shown in Table 6.2 below.

**Table 6.2 - Monthly Savings on RT10 Bill Caused by Switching to TOU Rates
(Based on New Methodology and includes GCT)**

Consumption	Step 1- LRMC (Avg. Rate)				
	No Change	10% Pk-Reduction	25% Pk-Reduction	33.3% Pk-Reduction	50% Pk-Reduction
	\$	\$	\$	\$	\$
90	(840.6)	(780.9)	(691.4)	(641.9)	(542.3)
100	(933.9)	(867.7)	(768.3)	(713.3)	(602.6)
150	(710.3)	(610.9)	(461.7)	(379.2)	(213.2)
200	(601.0)	(449.7)	(222.7)	(97.2)	155.5
250	(351.1)	(161.9)	121.7	278.7	594.5
300	(101.1)	125.8	466.2	654.6	1,033.6
350	148.8	413.6	810.7	1,030.5	1,472.7
400	398.8	701.3	1,158.3	1,411.3	1,920.4
450	653.4	996.4	1,510.8	1,795.4	2,368.2
500	910.6	1,291.7	1,863.3	2,179.6	2,815.9
550	1,167.9	1,587.0	2,215.8	2,563.7	3,263.7
600	1,425.1	1,882.4	2,568.3	2,947.8	3,711.5
650	1,682.4	2,177.7	2,920.8	3,332.0	4,159.2
700	1,939.6	2,473.1	3,273.3	3,716.1	4,607.0
750	2,196.8	2,768.4	3,625.8	4,100.2	5,054.8
800	2,454.1	3,063.8	3,978.3	4,484.3	5,502.5
850	2,711.3	3,359.1	4,330.8	4,868.5	5,950.3
900	2,968.5	3,654.4	4,683.3	5,252.6	6,398.1
950	3,225.8	3,949.8	5,035.8	5,636.7	6,845.8
1,000	3,483.0	4,245.1	5,388.3	6,020.9	7,293.6

6.6.2. It is evident from the outcomes set out in Table 6.2 above that those customers consuming 350 kWh per month would realize savings of \$148.80 by moving from RT10 Standard to TOU without any change in behavior. At the low end, a customer consuming 350 kWh would realize a saving and at the high end, the consumption of 1,000 kWh would yield a \$3,483.00 saving for the month without any change.

6.6.3. This variation in the ‘No Change’ saving is quite wide. It is explained by distortions in the rate arising from the two-block energy rate structure and the application of a GCT above the 150 kWh threshold. To minimize JPS’s risk of revenue losses a second step is applied.

6.6.4. Step 2 involves the addition of a tiered customer charge for TOU customer. This approach is to reduce the utility’s risk of revenue even while keeping the billing process relatively simple. In this regard, the incremental customer charge for the TOU rate category shall be:

- 300 – 500kWh: \$275 per Month
- 500 – 800kWh: \$1,500 per Month
- “ >800kWh”: \$3,000 per Month

6.6.5. Table 6.3 below shows the outcome of step 2. This represents the rationalization of the savings to be derived from TOU by RT10 customers.

Table 6.3 - Monthly Savings on RT10 Bill Caused by Switching to TOU Rates (Based on New Methodology with Tiered Customer Charge and includes GCT)

Consumption	Step 2- LRM (Avg. Rate)				
	No Change	10% Pk-Reduction	25% Pk-Reduction	33.3% Pk-Reduction	50% Pk-Reduction
	\$	\$	\$	\$	\$
90	(840.55)	(780.91)	(691.44)	(641.94)	(542.33)
100	(933.95)	(867.68)	(768.27)	(713.26)	(602.59)
150	(710.26)	(610.86)	(461.75)	(379.24)	(213.23)
200	(600.99)	(449.69)	(222.75)	(97.17)	155.49
250	(351.05)	(161.93)	121.75	278.72	594.55
300	(381.46)	(154.51)	185.90	374.27	753.27
350	(131.52)	133.25	530.40	750.16	1,192.32
400	118.41	421.01	877.95	1,130.97	1,640.06
450	373.07	716.02	1,230.45	1,515.10	2,087.82
500	(618.48)	(237.43)	334.16	650.43	1,286.80
550	(361.25)	57.91	686.66	1,034.56	1,734.56
600	(104.01)	353.26	1,039.16	1,418.69	2,182.33
650	153.23	648.60	1,391.66	1,802.82	2,630.09
700	(1,118.67)	(585.19)	215.03	657.82	1,548.73
750	(861.43)	(289.85)	567.53	1,041.95	1,996.49
800	(604.19)	5.50	920.03	1,426.08	2,444.26
850	(346.96)	300.84	1,272.53	1,810.20	2,892.02
900	(89.72)	596.18	1,625.03	2,194.33	3,339.79
950	167.52	891.53	1,977.54	2,578.46	3,787.55
1,000	424.76	1,186.87	2,330.04	2,962.59	4,235.32

- 6.6.6. At the aggregate level, the new methodology should insulate JPS against revenue losses from customers that transition from RT10 Standard to RT10 TOU without actually changing their usage patterns.
- 6.6.7. As shown in Table 6.3 above, customers consuming 250 kWh can realize savings of approximately \$595 by reducing and transferring 50% of their On-peak consumption to the Off-peak period. This saving translates to a 4% reduction in their monthly bills. At the high consumption end, a customer with a 1,000 kWh monthly usage could see a 7% reduction or a \$4,235 saving by taking the same course of action.
- 6.6.8. Arising from the new rationalized methodology, the revised RT10 TOU structure will include a tiered customer charge as well as energy rates that vary across three (3) periods. The revised TOU charges that would have been applicable for the 2019-2024 Determination Notice under the rationalized methodology are shown in Table 6.4 below.

**Table 6.4 - RT10 TOU Charges under Old and New Rationalized Methodologies
(Based on 2019-2024 Rate Review Determination Notice)**

Rate Class	Period	Original Methodology	New Rationalized Methodology
Energy Rate	Peak	\$15.01 per kWh	\$55.50 per kWh
	Partial-peak	\$13.13 per kWh	\$11.22 per kWh
	Off-peak	\$9.38 per kWh	\$8.56 per kWh
Customer Charge (per month)	0 -300 kWh	-	\$ 525.85
	300 -500 kWh	-	\$ 800.85
	500 - 800 kWh	-	\$ 2,025.85
	>800kWh	-	\$ 3,525.85

6.7 Rate 20 TOU

- 6.7.1. An analysis of the RT20 TOU rates based on the original methodology and billing data for 2020 February indicates that for the RT20 category, switching from Standard to the TOU option would result in an increase in monthly bills to such customers in most cases.
- 6.7.2. Similar to the new RT10 TOU methodology, the OUR made the following adjustments to the computation of the RT20 TOU rates:
1. LRMC analysis from the 2019-2024 Determination Notice was used to determine the price relationship across TOU periods;
 2. The average daily usage of electricity is distributed between On-peak, Partial peak and Off-peak periods in the ratio 11.4%: 66.6%: 22%. This reflects the consumption distribution presented by JPS in relation to its RT20 load curve.
- 6.7.3. An assessment of the RT20 TOU rates approved in the 2019-2024 Rate Review Determination Notice indicates that JPS could lose approximately \$333.07 per month for

every customer that switched from the Standard to the TOU classification. This windfall would accrue to customers even if there were no changes in their consumption behavior.

6.8 New Methodology

- 6.8.1. Again, the two-step approach was employed to derive new RT20 TOU rates predicated on the 2019-2024 Determination Notice parameters. Based on the application of the LRMC and the RT20 load curve, the TOU energy rates were calculated to be On-Peak: \$33.50 per kWh, Partial Peak: \$6.64 per kWh and Off-Peak \$3.14 per kWh.
- 6.8.2. The billing simulation using the computed TOU energy rates with the 2020 February billing data reveals that switching from Standard to TOU will result in a \$333.07 monthly saving for the customer regardless of the level of consumption (see Table 6.5 below).

**Table 6.5 - Monthly Savings on RT20 Bill Caused by Switching to TOU Rates
(Based on New Methodology and includes GCT)**

Consumption	Step1 - LRMC (Avg. Rate)				
	No Change	10% Pk-Reduction	25% Pk-Reduction	33.3% Pk-Reduction	50% Pk-Reduction
	(\$)	(\$)	(\$)	(\$)	(\$)
90	333.07	369.52	424.21	454.46	515.3
100	333.07	373.57	434.33	467.95	535.6
150	333.07	393.83	484.96	535.39	636.9
200	333.07	414.08	535.59	602.83	738.1
250	333.07	434.33	586.23	670.27	839.4
300	333.07	454.58	636.86	737.71	940.6
350	333.07	474.84	687.49	805.15	1,041.9
400	333.07	495.09	738.12	872.60	1,143.2
450	333.07	515.34	788.75	940.04	1,244.4
500	333.07	535.59	839.38	1,007.48	1,345.7
550	333.07	555.85	890.01	1,074.92	1,447.0
600	333.07	576.10	940.64	1,142.36	1,548.2
650	333.07	596.35	991.28	1,209.80	1,649.5
700	333.07	616.60	1,041.91	1,277.24	1,750.7
750	333.07	636.86	1,092.54	1,344.68	1,852.0
800	333.07	657.11	1,143.17	1,412.12	1,953.3
850	333.07	677.36	1,193.80	1,479.56	2,054.5
900	333.07	697.61	1,244.43	1,547.00	2,155.8
950	333.07	717.87	1,295.06	1,614.45	2,257.1
1,000	333.07	738.12	1,345.69	1,681.89	2,358.3

- 6.8.3. Customer savings without any behavioral change in usage would result in a loss of revenue to JPS. Consequently, Step 2 was considered necessary. This involves the introduction of an incremental customer charge, in the amount of \$327 per month. Unlike the RT10 TOU, this customer category has simple features. The RT20 customer category has a single energy

rate and GCT is applicable to all kWhs consumed. Consequently, a single increment to the customer charge eliminates the ‘No Change’ windfall.

6.8.4. The simulation including an increase in the customer charge for customers taking up the TOU option is shown in Table 6.6 below.

**Table 6.6 - Monthly Savings on RT20 Bill Caused by Switching to TOU Rates
(Based on New Rationalized Methodology and includes GCT)**

Consumption	Step 2 - LRM (Avg. Rate)				
	No Change	10% Pk-Reduction	25% Pk-Reduction	33.3% Pk-Reduction	50% Pk-Reduction
	(\$)	(\$)	(\$)	(\$)	(\$)
90	(0.28)	369.52	424.21	454.46	515.34
100	(0.28)	373.57	434.33	467.95	535.59
150	(0.28)	393.83	484.96	535.39	636.86
200	(0.28)	414.08	535.59	602.83	738.12
250	(0.28)	434.33	586.23	670.27	839.38
300	(0.28)	454.58	636.86	737.71	940.64
350	(0.28)	474.84	687.49	805.15	1,041.91
400	(0.28)	495.09	738.12	872.60	1,143.17
450	(0.28)	515.34	788.75	940.04	1,244.43
500	(0.28)	535.59	839.38	1,007.48	1,345.69
550	(0.28)	555.85	890.01	1,074.92	1,446.96
600	(0.28)	576.10	940.64	1,142.36	1,548.22
650	(0.28)	596.35	991.28	1,209.80	1,649.48
700	(0.28)	616.60	1,041.91	1,277.24	1,750.74
750	(0.28)	636.86	1,092.54	1,344.68	1,852.01
800	(0.28)	657.11	1,143.17	1,412.12	1,953.27
850	(0.28)	677.36	1,193.80	1,479.56	2,054.53
900	(0.28)	697.61	1,244.43	1,547.00	2,155.80
950	(0.28)	717.87	1,295.06	1,614.45	2,257.06
1,000	(0.28)	738.12	1,345.69	1,681.89	2,358.32

6.8.5. The simulation shows the monthly savings that would be derived by the customer under a ‘No Change’ in consumption pattern scenario along with four (4) other simultaneous “peak-shaving” and “valley-filling” cases ranging from 10% to 50%.

6.8.6. For the RT20 TOU the rewards are not as sensitive to behavioural changes as would be the case for RT10 customers. A 10% peak-shave and valley-fill action would cause the monthly bill of a 100 kWh per month consumer to fall by \$373.57 per month. For a customer using 1,000 kWh per month, a 50% peak-shave and valley-fill action would yield savings of \$2,358.32 or a 4.8% bill reduction.

6.8.7. Arising from the new rationalized methodology, the revised TOU energy rates and customer charge that would have been applicable for the 2019-2024 Determination Notice under the rationalized methodology are shown in Table 6.7 below.

**Table 6.7 - RT20 TOU Charges under Old and New Rationalized Methodologies
(Based on 2019-2024 Rate Review Determination Notice)**

Rate Class	Rate/Charge	Period	New Rationalized Methodology (2020)
Rate 20 TOU	Energy Rate	Peak	\$33.50 per kWh
		Partial-peak	\$6.64 per kWh
		Off-peak	\$3.14 per kWh
	Customer Charge (\$/month)	All kWhs	\$1,448.23

6.9 OUR's Decision

Revenue Losses

- 6.9.1. From the analysis, it is evident that JPS's concern for the 'haemorrhaging of revenues' from the RT10 TOU group has been addressed. The simulation shows that with the application of the 'Revised' or "New Rationalized" methodology, the arbitrage opportunity, which existed in transitioning to TOU rates under the previously approved 2019-20124 tariff, is no longer the case.
- 6.9.2. In light of this, the OUR has applied the annual growth factor of 1.16% to the TOU rates derived from the Revised methodology. Consequently, the Office approves the RT10 and RT20 TOU rates in Table 6.8 below for implementation.

**Table 6.8 - RT10 & RT 20 TOU Rates to be Implemented
(Based on the 2021 Annual Review)**

Rate Class	Rate/Charge	Period	New Rationalized Methodology (2021)
Rate 10 TOU	Energy Rate (\$/kWh)	Peak	56.17
		Partial-peak	11.35
		Off-peak	8.75
	Customer Charge (\$/month)	0 -300 kWh	532.16
		300 -500 kWh	810.46
		500 - 800 kWh	2,050.16
		>800kWh	3,568.16
Rate 20 TOU	Energy Rate (\$/kWh)	Peak	33.90
		Partial-peak	6.72
		Off-peak	3.18
	Customer Charge (\$/month)	All kWhs	1,465.61

Eligibility Criteria

6.9.3. With respect to JPS’s concern about the eligibility criteria targeted towards households and businesses, from an economic perspective, the OUR considers that no such criteria is necessary. This is so because apart from the implicit cost of switching from the Standard rate to the TOU option, if a customer makes the transition without any positive behavioral change, in most instances it would cost the customer more. Hence, there is no need for any further criterion to regulate who takes up the option.

GCT Calculation

6.9.4. Given the introduction of TOU periods with different energy rates, the charging of GCT on consumption above 150 kWh becomes problematic since under a TOU regime not all kWhs are considered equal. The only way to get around this challenge is to identify a simple rule that assigns priority to the TOU buckets that should be given an exemption.

6.9.5. In light of this, the OUR recommends that the buckets in line for the 150 kWh exemption should be ranked as follows: 1st -Off-peak; 2nd - Partial-peak and 3rd On-peak. In this order, persons with low Off-peak consumption stands to benefit if customers shave consumption from the On-peak period and shifts it to the Off-peak bucket. Further, the OUR recognizes that ultimately the configuration of GCT rests with the Government of Jamaica and JPS.

Net Billing Customers

- 6.9.6. Most Net-billing customers meet, or supplement their consumption during the day with solar-PV generation. Consequently, their demand rises steeply during the On-peak period. With the existing Standard RT10 classification, these customers benefit from an average tariff during the On-peak period. In this regard, Net-billing customers should be required to pay rates that would better reflect the cost.
- 6.9.7. In the 2019-2024 Rate Review Application, JPS proposed the introduction of a Distributed Energy Rate (DER) category, which would, among other things, be the rate category for Net-billing customers. However, the Office requested that JPS revisits its DER design and resubmit it to the OUR for reconsideration.
- 6.9.8. In the interim, the OUR takes the view that Net-billing customers would fit better in the TOU category. JPS is yet to resubmit its proposal for the OUR's consideration. Hence, in the interim the OUR considers the TOU option to be more suitable for Net-billing customers.

Refinement of the Option

- 6.9.9. The OUR recognizes that all the information required to perfect the design of the TOU option is not available, and in some instances would not be accessible until the option has been implemented. In this regard, JPS is requested to keep detailed information on the demand (KW/KVA), consumption (kWh), load curve and bill payments of customers before and after taking the option.
- 6.9.10. This will allow JPS and the OUR to revisit and refine the option further at the 2022 Annual Review.

Determination 6

Based on the its revised analysis of the RT10 TOU and RT20 TOU rates, the Office has determined that:

a) The Rate 10 TOU rates shall be as follows:

Energy Rate

- On-peak (6:00pm – 10:00pm) : \$56.17 per kWh
- Partial-peak (6:00am – 6:00pm) : \$11.35 per kWh
- Off Peak (10:00pm – 6:00am) : \$8.75 per kWh

Customer Charge (monthly)

- 0 – 300kWh: \$532.16
- 300 – 500kWh: \$810.46
- 500 – 800kWh: \$2,050.16
- > 800kWh: \$3,568.16

b) The Rate 20 TOU rates shall be as follows:

- On-peak (6:00pm – 10:00pm) : \$33.90 per kWh
- Partial-peak (6:00am – 6:00pm) : \$6.72 per kWh
- Off Peak (10:00pm – 6:00am) : \$3.18 per kWh

Customer Charge (monthly)

- All kWhs: \$1,465.61

c) The decision to shift all Net-billing customers to the TOU category shall remain unchanged.

d) JPS shall roll out its TOU programme over 6 months from the effective date of this Determination Notice, during which, JPS shall engage customers in a well-structured education/promotion programme concerning the nature of TOU rates. In addition, JPS may transfer net-billing customers to this category.

e) JPS shall be required to keep detailed information on the demand (KW/KVA), consumption (kWh), load curve and bill payment of customers who transition to the TOU category before and after being transferred/taking the option, to facilitate further refinement of the rate design.

6.10 Electric Vehicles

Background

- 6.10.1. In the 2019-2024 Rate Review, JPS indicated its intentions to invest in an island-wide electric vehicle (EV) charging infrastructure. The company proposed an interim rate of J\$26.97/kWh, along with a pricing tier system based on the chargers being used at a level two or a level three charger. The level three chargers would be rated at a higher capacity and as such would attract the higher rate.
- 6.10.2. In response, the OUR took the view that the two-tier pricing system proposed, required further analysis before it could be implemented. In light of this, the Office determined that the rates for EVs should be based on the approved TOU structure. As such, the EV energy rate should be equal to the RT10 TOU energy rates plus a 5% premium.
- 6.10.3. Given the weakness JPS identified in the RT10 TOU rates set out in the 2019-2024 Determination Notice, the company expressed reservations regarding the application of EV rates based on its linkage to the TOU rates. As a result, JPS proposed a review and modification to the EV tariff.

6.11 OUR's Decision

- 6.11.1. The OUR acknowledges that there was a flaw in the previous design of the RT10 TOU rate, as such these rates were reviewed. In this regard, the revision of the RT10 TOU rates detailed earlier has facilitated the development of EV rates that are better suited for revenue recovery. As such, the previous methodology established in the 2019-2024 Determination Notice, which links EV rates to RT10 TOU rates shall remain in effect.

Determination 7

The decision established in the 2019-2024 Determination Notice for Electric Vehicle (EV) rates at public charging facilities stands. The energy charge shall be equivalent to the RT10 TOU rates plus 5%.

6.12 Standby and Distributed Energy Resources (DER) Tariff

Background

- 6.12.1. In its 2019-2024 Rate Review Application, JPS proposed a new Distributed Energy Resources (DER) Tariff. This new customer category was intended to serve customers with on-site generation facilities. In this respect, all net-billing customers and customers using Standby service would be captured under the DER category. Consequently, the DER tariff, among other things, was intended to replace the existing Standby tariff.
- 6.12.2. The proposed DER rates was designed with a customer charge, energy charge, a peak demand charge, a base demand charge and a reliability capacity charge.
- 6.12.3. As stated in the 2019-2024 Determination Notice, the OUR sees merit in the company's DER tariff proposal. However, in its Determination Notice, the OUR identified several gaps in the design. In this respect, the implementation of the rate was deemed not prudent.

- 6.12.4. In light of this, the OUR noted JPS’s concerns regarding the rapidly changing energy landscape. This is particularly true as it relates to the increasing availability of self-generation. As such, the OUR stated in the 2019-2024 Determination Notice that “if JPS elects to do so, it may present its revised DER construct at the next Annual Review for regulatory consideration.” Implicit in this decision is the understanding that JPS’s Standby rate tariff is inextricably linked to its DER tariff. Therefore, by fixing the weaknesses of its proposed DER tariff, its concerns about establishing a new Standby rate regime would be simultaneously addressed.
- 6.12.5. JPS did not submit a revised DER tariff proposal in its 2021 Annual Review Application. However, the company indicated an intention to make a submission in 2021 August. Additionally, the company argued that the existing Standby rate does not adhere to key rate setting principles with specific emphasis on cost-reflectivity and proposed that in the interim, the Non-Firm Standby category be omitted from the Rate Schedules.

OUR’s Decision

- 6.12.6. The OUR takes the view that JPS has been given an opportunity to rectify and refashion its DER tariff and in so doing, it would address the existing Standby rates which it contends are outmoded.
- 6.12.7. It is important to note that the OUR in its 2019-2024 Determination Notice, is not imposing JPS’s Standby rates that did not previously exist in its Rate Schedules. The OUR, however, takes the view that it would not be appropriate to deny customers an existing option while JPS addresses the deficiencies in its proposed DER tariff.
- 6.12.8. In light of this, the OUR maintains that the issue of new Standby rates cannot be separated from the refashioning of JPS’s proposed DER tariff. Consequently, the existing Standby rate and structure shall remain in effect. The OUR awaits JPS’s revised DER tariff submission for its evaluation.

Determination 8

The existing Standby rate and structure shall remain in effect pending the submission by JPS and approval by the Office of a Distributed Energy Resource tariff.

6.13 Streetlight Customer Charge Per Lamp Fixture

Background

- 6.13.1. In its 2019-2024 Rate Review Application, JPS had proposed a change in the structure of its streetlight tariff. In essence, the company requested “a modification of the RT 60 Street light tariff to include a monthly customer charge per fixture.” However, the OUR in its 2019-2024 Determination Notice maintained the traditional approach to the streetlight tariff structure, which entails a customer charge per municipal council and the relative energy

charges. JPS has renewed its call for a change to the structure in its 2021 Annual Review Application.

- 6.13.2. JPS argued that the monthly customer charge per fixture approach is in “keeping with the current practice of a customer charge being associated with a single and unique premise.” Further, implicit in its request is the assumption that with the full roll-out of its Smart Streetlight Programme, which it expects to be completed by the end of 2021, its new cost structure will show an increase in the proportion of fixed cost, relative to variable cost.

OUR’s Decision

- 6.13.3. The OUR is cognizant that the roll-out of smart streetlights will increase the proportion of fixed costs relative to the total cost of providing streetlight services. Further, the relative increase in fixed cost will grow with each additional smart streetlight installed. In this respect, the call for a fixed charge per lamp is plausible.
- 6.13.4. However, there is a logical distinction between a customer charge and a fixed charge per lamp and each should be designed to recover different types of costs. The customer charge is to meet customer-related expenditures and a fixed charge per lamp should address demand related expenses. In this regard, the OUR takes the view that the streetlight non-fuel rate structure should be based on a three-part tariff (i.e. include customer, capacity per lamp and energy charges).
- 6.13.5. Notwithstanding the delays in the roll-out, which no doubt has been further set back by the effects of the COVID-19 pandemic, the OUR takes the view that reconfiguration of the streetlight rate structure should await the full implementation of the smart streetlight project, as this will allow for a detailed analysis of the structure of costs.
- 6.13.6. Further, given the revenue-cap constructs on which JPS’s tariff is predicated, the risk of revenue losses owing to the more efficient consumption of energy by smart streetlights is virtually non-existent.
- 6.13.7. In light of this, the existing streetlight rate structure regime shall remain in place until the project is completed. In addition, the OUR awaits a full report as to how the additional benefits of the Smart Streetlight Programme will be realized. These benefits are to include, among other things, “intelligent features for reading, monitoring, dimming, and video surveillance technology.”

Determination 9

The Office has determined that JPS’s request for a fixed charge per lamp is not unreasonable; however, it should not be seen as a substitute for the Customer Charge. The OUR will revisit the streetlight tariff structure after the full roll-out of the Smart Streetlight Programme and JPS has presented relevant details on the proposed streetlight cost structure.

6.14 Methodology for Change in Computing kVA Demand for Time-of-Use Customers

6.14.1. The Office took the decision in the 2019-2024 Determination Notice to simplify the rules governing the calculation of TOU demand charges for all applicable customer categories (i.e. RT40, RT50 and RT70 classes).

6.14.2. In this regard, the OUR outlined the calculation rules in the Addendum issued on 2021 January 29. In simplifying the rules, it was intended that the bill computation for any given TOU period would be determined completely by the billing determinants in the relevant TOU period. However, even though this was captured correctly for the peak and off-peak periods, this was not the case for the partial-peak period. In Determination #29A the calculation rule states:

*“**Partial-Peak Period:** The Billing Demand in this period each month shall be the maximum demand for the partial-peak hours of that month, or 80% of the maximum demand for the on-peak and partial-peak hours during the five-month period immediately preceding the month for which the bill is rendered, whichever is higher but not less than 25 kVA.”*

6.14.3. Subsequent to the publication of the Addendum and arising from discussions between JPS and the OUR’s technical teams, the OUR clarified the rule. In other words, the OUR indicated that the ‘on-peak demand’ should be omitted from the narrative, since the calculation should only reflect partial-peak demand and partial-peak hours.

6.14.4. JPS again raised the issue in its 2021 Annual Review application, therefore, to ensure there is no doubt concerning the partial-peak billing calculation rule, the applicable procedure shall be as follows:

*“**Partial-Peak Period:** The Billing Demand in this period each month shall be the maximum demand for the partial-peak hours of that month, or 80% of the maximum partial-peak demand during the five-month period immediately preceding the month for which the bill is rendered, whichever is higher but not less than 25 kVA.”*

6.14.5. Accordingly, Determination #29A of the Addendum shall be replaced by the Determination below.

Determination 10

JPS shall effect customizations to its Customer Information System (CIS) that will allow billing of demand charges as follows:

- On-Peak Period: Billing Demand in this period each month shall be the maximum demand for the On-Peak hours of that month. The minimum 25 kVA does not apply.
- Partial-Peak Period: The Billing Demand in this period each month shall be the maximum demand for the partial-peak hours of that month, or 80% of the maximum partial-peak demand during the five-month period immediately preceding the month for which the bill is rendered, whichever is higher but not less than 25 kVA.
- Off-Peak Period: The Billing Demand in this period each month shall be the maximum demand for the Off-Peak for that month, or 80% of the maximum Off-Peak demand during the five-month period immediately preceding the month for which the bill is rendered, whichever is higher but not less than 25 kVA.

6.15 Revenue Basket Compliance

- 6.15.1. Under the revenue cap regime, the revenue basket is compliant if for a given target demand (quantity demand) the price of electricity, within the basket of rates, is set so that the product of the two will yield the approved Revenue Target for 2021 (ART₂₀₂₁).
- 6.15.2. With the advent of COVID-19 and the government's efforts to contain the spread of the pandemic, which commenced 2020 mid-March, it was evident that the 'normal' demand forecast was no longer plausible. Hence, the billing determinants approved in the 2019-2024 Determination Notice were revised by the OUR in collaboration with JPS. Details of the revision process are set out in Section 6.8 below.
- 6.15.3. The existing rates, shown in Table 6.9 below, were approved in the 2019-2024 Determination Notice and were set to allow JPS to recover the 2020 Approved Revenue Cap of J\$41,211,019,369.00.

Table 6.9 - 2020 Approved Non-Fuel Rates

Class	Customer Charge	Energy-J\$/kWh				Demand-J\$/KVA			
		Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak
Current Rates									
Rate 10	V < 100	525.85	7.24	-	-	-	-	-	-
Rate 10	V > 100	525.85	20.79	-	-	-	-	-	-
Rate 20	LV	1,121.23	8.93	-	-	-	-	-	-
Rate 40	LV - Std	7,899.62	6.02	-	-	-	2,705.83	-	-
Rate 40	LV - TOU	7,899.62	-	5.06	5.19	5.80	-	323.31	1,113.85
Rate 50	MV - Std	7,899.62	4.27	-	-	-	1,874.86	-	-
Rate 50	MV - TOU	7,899.62	-	4.20	4.31	4.81	-	307.71	862.37
Rate 70	MV -STD	7,899.62	4.26	-	-	-	2,484.93	-	-
Rate 70	MV -TOU	7,899.62	-	4.58	4.70	5.25	-	308.93	860.63
Rate 60	S	3,185.33	12.25	-	-	-	-	-	-
Rate 60	T	3,185.33	11.81	-	-	-	-	-	-

6.15.4. In order for JPS to recover the approved ART₂₀₂₁ of J\$44,578,820,493.00 and in so doing maintain the tariff structure approved in the 2019-2024 Determination Notice, the existing 2019 rates were evenly adjusted by a derived factor of 1.16% as shown in Table 6.10 below.

Table 6.10 - Price Escalation Factor

Class	Customer Charge	ESCALATION FACTOR							
		Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak
Current Rates									
Rate 10	LV < 100	1.16%	1.16%						
Rate 10	LV > 100	1.16%	1.16%						
Rate 20	LV	1.16%	1.16%						
Rate 40	LV - Std	1.16%	1.16%				1.16%		
Rate 40	LV - TOU	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%
Rate 50	MV - Std	1.16%	1.16%				1.16%		
Rate 50	MV - TOU	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%
Rate 70	MV -STD	1.16%	1.16%				1.16%		
Rate 70	MV -TOU	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%	1.16%
Rate 60	S	1.16%	1.16%	-	-	-	-	-	-
Rate 60	T	1.16%	1.16%	-	-	-	-	-	-

6.15.5. The product of the revised 2021 Target Billing Determinants and the Approved Non-Fuel Tariffs for 2021 yields the approved ART₂₀₂₁ in the amount of J\$44.579 billion derived in Section 4.3.6 above.

6.15.6. Tables 6.11, 6.12 and 6.13 below show the details of the Target Billing Determinants 2021 (revised), the 2021 Approved Non-Fuel Tariffs and the ART₂₀₂₁ revenue basket respectively.

Table 6.11- Target Billing Determinants 2021 (Revised)

Class	Average 2020 Customer	Energy kWh				Demand-KVA			
		Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak
Rate 10 LV < 100	617,023	548,123,560	-	-	-	-	-	-	-
Rate 10 LV > 100	-	581,058,734	-	-	-	-	-	-	-
Rate 20 LV	69,837	560,285,434	-	-	-	-	-	-	-
Rate 40 LV - STD	1,787	651,957,994	-	-	-	2,241,744	-	-	-
Rate 40 LV - TOU	112	-	53,023,838	47,827,406	12,438,257	-	278,912	289,791	234,204
Rate 50 MV - STD	126	199,000,901	-	-	-	704,421	-	-	-
Rate 50 MV - TOU	23	-	19,209,831	18,912,978	6,119,423	-	173,188	172,350	131,745
Rate 70 MV - STD	20	204,080,440	-	-	-	783,298	-	-	-
Rate 70 MV - TOU	4	-	20,953,956	18,009,617	5,410,619	-	111,089	119,431	105,012
Rate 60 S	188	48,814,594	-	-	-	-	-	-	-
Rate 60 T	317	581,891	-	-	-	-	-	-	-
TOTAL	689,437	2,793,903,548	93,187,624	84,750,002	23,968,299	3,729,462	563,189	581,572	470,962

Table 6.12 - Approved Non-Fuel Tariffs for 2021

Class	Customer Charge	Energy-J\$/kWh				Demand-J\$/KVA			
		Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak
Current Rates									
Rate 10 LV < 100	531.93	7.32							
Rate 10 LV > 100	-	21.03							
Rate 20 LV	1,134.20	9.03							
Rate 40 LV - Std	7,990.99	6.09				2,737.13			
Rate 40 LV - TOU	7,990.99	-	5.12	5.25	5.87	-	327.05	1,126.73	1,526.68
Rate 50 MV - Std	7,990.99	4.32				1,896.55			
Rate 50 MV - TOU	7,990.99	-	4.25	4.36	4.87	-	311.27	872.34	1,177.23
Rate 70 MV - STD	7,990.99	4.31				2,513.67			
Rate 70 MV -TOU	7,990.99	-	4.63	4.75	5.31	-	312.50	870.58	1,333.86
Rate 60 S	3,222.17	12.39							
Rate 60 T	3,222.17	11.95							

Table 6.13 - Revenue Basket - Approved Revenue Target for 2021 (ART₂₀₂₁)

Class	Customer Revenue	Energy Revenue				Demand (KVA) revenue				Total Revenue
		Std.	Off-Peak	Part Peak	On-Peak	Std.	Off-Peak	Part Peak	On-Peak	
Rate 10 LV < 100	3,938,574,333	4,014,316,392	-	-	-					7,952,890,726
Rate 10 LV > 100	-	12,219,940,334								12,219,940,334
Rate 20 LV	950,511,294	5,061,221,610	-	-	-					6,011,732,904
Rate 40 LV - Std	171,395,798	3,970,184,313	-	-	-	6,135,938,686	-	-	-	10,277,518,797
Rate 40 LV - TOU	10,712,237	-	271,403,995	251,095,395	72,976,342	-	91,218,170	326,517,062	357,554,417	1,381,477,618
Rate 50 MV - Std	12,068,729	859,562,540	-	-	-	1,335,965,978	-	-	-	2,207,597,247
Rate 50 MV - TOU	2,219,167	-	81,614,512	82,457,803	29,774,886	-	53,908,127	150,348,522	155,094,857	555,417,874
Rate 70 MV - STD	1,958,145	879,438,643	-	-	-	1,968,954,770	-	-	-	2,850,351,558
Rate 70 MV -TOU	343,261	-	97,079,173	85,624,274	28,734,311	-	34,715,682	103,974,804	140,071,525	490,543,030
Rate 60 LV	7,252,014	604,895,470	-	-	-	-	-	-	-	612,147,484
Rate 60 LV	12,251,304	6,951,618	-	-	-	-	-	-	-	19,202,922
TOTAL	5,107,286,283	27,616,510,919	450,097,680	419,177,472	131,485,539	9,440,859,434	179,841,979	580,840,389	652,720,800	44,578,820,493

6.16 Prepaid IPP Decoupling

6.16.1. JPS, in its submission, stated that prepaid rates for residential and small commercial customers continue to have an embedded IPP charge, which is inconsistent with the OUR’s decision set out the Final Criteria that IPP charges must be separated from JPS’s non-fuel charges. Consequently, the company requested the decoupling of the IPP charges from the prepaid rate charges to residential and small commercial customers.

6.16.2. JPS explained further that the decoupling of IPP charges would mean that the fuel charge displayed on these bills would no longer be reflective of IPP surcharge, but would now be only the pure fuel charge.

6.16.3. The OUR reviewed the request and has no objection to the decoupling of the IPP charges from residential and small commercial prepaid rates. This approach is consistent with the decision in the Final Criteria, which states that IPP costs shall be decoupled from other JPS non-fuel costs and treated as a direct line item on customers' monthly bills.

6.17 Prepaid-Rates: Residential Customers (Rate 10)

6.17.1. The OUR's computation of prepaid rates remains consistent with the approach taken in the 2019-2024 Determination Notice. Table 6.14 below shows the revenue comparisons of the prepaid and post-paid rates using the assumption that all post-paid customers migrate to pre-paid metering. The analysis shows that benefits would accrue only to customers whose consumption levels are 114kWh and below per month. The aggregate benefit to this group of customers would be approximately J\$34.3 million/month and this is due to the discounted lifeline rate, which is allowed to all residential customers.

Table 6.14 - Comparison of prepaid and post-paid non-fuel bills for average consumption in intervals (OUR) – Two-Tiered

Customer Bands	Customer Count	2014 Test Year Demand (MWh)	Average Consumption (kWh/month)	Post-paid Rate	Pre-paid Rate	Monthly Post-paid Revenue	Monthly Pre-paid Revenue	Monthly Variance	Annual Variance
0-50 kWh	82,440	23,081	23.33	30.12	13.85	57,930,555.02	26,638,054.02	(31,292,501.00)	(375,510,012.00)
50-100 kWh	111,262	103,177	77.28	14.20	13.85	122,096,248.51	119,086,833.94	(3,009,414.57)	(36,112,974.84)
100-200 kWh	203,929	354,278	144.77	15.23	15.23	449,632,264.26	449,632,264.26	-	-
200-300 kWh	80,328	232,621	241.32	17.55	17.55	340,202,414.45	340,202,414.45	-	-
300-400 kWh	27,945	114,811	342.37	18.58	18.58	177,764,700.90	177,764,700.90	-	-
400-500 kWh	11,225	59,760	443.67	19.14	19.14	95,316,700.73	95,316,700.73	-	-
500-1000 kWh	12,396	97,893	658.10	19.76	19.76	161,198,278.18	161,198,278.18	-	-
>1000 kWh	3,540	86,835	2,044.14	20.62	20.62	149,211,590.47	149,211,590.47	-	-
Total						1,495,422,198	1,492,412,783	(34,301,916)	(411,622,987)

6.17.2. In deriving the pre-paid rates, the discount benefit of the lifeline rate is preserved. The approved non-fuel pre-paid rates for RT10 customers are as follows:

- (i) J\$13.85/kWh for the first 117kWh within a thirty (30)-day consumption cycle;
- (ii) J\$21.03/kWh for each additional kWh thereafter within that thirty (30)-day consumption cycle.

Determination 11

The approved non-fuel pre-paid rates for RT10 customers are as follows:

- (i) J\$13.85/kWh for the first 117kWh within a thirty (30)-day consumption cycle
- (ii) J\$21.03/kWh for each additional kWh thereafter within that thirty (30)-day consumption cycle

The IPP rate shall be displayed as a separate line item on the customer's bill.

6.18 Pre-Paid Rates: Small Commercial Customers (Rate 20)

6.18.1. The OUR’s computation of prepaid rates remains consistent with the approach taken in the 2019-2024 Determination Notice. Table 6.15 below shows the revenue comparisons of the prepaid and post-paid rates. The rates for this service shall remain revenue-neutral when compared to post-paid Rate 20 rates.

Table 6.15 - Comparison of Prepaid and Postpaid Non-Fuel Revenues for Average Consumption in Intervals – Rate 20 Customers

Customer Bands	Customer Count	Test Year Demand (MWh)	Average Consumption (kWh/month)	Post-paid Rate	Pre-paid Rate	Monthly Post-paid Revenue	Monthly Pre-paid Revenue	Monthly Variance	Annual Variance
(0-50] kWh	10,940	2,778	21.16	62.63	62.63	14,498,244	14,498,244	-	-
(50-100] kWh	7,781	6,982	74.78	24.20	24.20	14,081,089	14,081,089	-	-
(100-1000] kWh	30,850	128,470	347.03	12.30	12.30	131,682,269	131,682,269	-	-
(1000-7500] kWh	9,482	283,614	2,492.56	9.49	9.49	224,290,968	224,290,968	-	-
>7500 kWh	1,002	218,449	18,172.28	9.09	9.09	165,475,101	165,475,101	-	-
Total						535,529,427	535,529,427	-	-

6.18.2. The rates to be charged are as follows:

- i. First 10kWh J\$122.45/kWh
- ii. Additional kWhs J\$9.03/kWh

Determination 12

The approved non-fuel pre-paid rate when compared with the post-paid rate shall be revenue-neutral for services to Rate 20 customers. The prepaid rates are as follows:

- (i) First 10kWh - J\$122.45/kWh
- (ii) Each additional kWh - J\$9.03/kWh

The IPP rate shall be displayed as a separate line item on the customer’s bill.

6.18.3. The Schedule of Rates for the 2021 Non-Fuel Rate are shown in Table 6.16 below

**Table 6.16 - The 2021 Non-Fuel Rate Schedule
(Base Exchange Rate J\$145.00: US\$1.00)**

Rate Category	Blocks	Customer Charge (J\$/Month)	Energy Charge (J\$/kWh)				Demand Charge (J\$/kVA)				Tariff Adjustment (J\$/kWh)
			STD	Peak	Partial Peak	Off Peak	STD	Peak	Partial Peak	Off Peak	
Rate 10 STD	0 - 100	531.93	7.32								-0.113
	> 100	531.93	21.03								-0.113
Rate 10 Pre-Paid	0 - 117		13.85								-0.113
	> 117		21.03								-0.113
Rate 10 TOU	0 -300 kWh	532.16									-0.113
	300 -500 kWh	810.46		56.17	11.35	8.75					
	500 -800 kWh	2,050.16									
	>800kWh	3,568.16									
Rate 20 STD		1,134.20	9.03								-0.113
Rate 20 Pre-Paid	0 - 10		122.45								-0.113
	> 10		9.03								-0.113
Rate 20 TOU		1,465.61		33.90	6.72	3.18					-0.113
Rate 40 STD		7,990.99	6.09				2,737.13				-0.113
Rate 40 TOU		7,990.99		5.87	5.25	5.12		1,526.68	1,126.73	327.05	-0.113
Rate 50 STD		7,990.99	4.32				1,896.55				-0.113
Rate 50 TOU		7,990.99		4.87	4.36	4.25		1,177.23	872.34	311.27	-0.113
Rate 60 Streetlight		3,222.17	12.39								-0.113
Rate 60 Traffic Signal		3,222.17	11.95								-0.113
Rate 70 STD		7,990.99	4.31				2,513.67				-0.113
Rate 70 TOU		7,990.99		5.31	4.75	4.63		1,333.86	870.58	312.50	-0.113
Electric Vehicles		-		58.98	11.92	9.19					

6.19 Demand Forecast

Introduction

6.19.1. As a part of the 2019-2024 Rate Review exercise, both JPS and the OUR developed independent demand forecasts for the 5-year period. Although the methodologies employed by JPS were not fundamentally different from those used by the OUR, there were variations in the approaches which caused differences in the forecasts that were statistically significant. For example, JPS used Auto Regressive Integrated Moving Average (ARIMA) modelling, while the OUR employed a simple averaging technique to derive unit consumption rate for customer categories. Consequently, the compound annual growth rate (CAGR) projected for energy sales by JPS for the period 2018-2024 was 1.8%, compared to the 2.5% forecast by the OUR.

6.19.2. As suggested in the 2019-2024 Determination Notice, JPS's forecast appeared too pessimistic while the OUR's initial forecast seemed somewhat optimistic. In this regard, there was the risk of adopting an unbalanced forecast if one of the two forecasts available were selected without modification. To mitigate this risk, the mean of both forecasts for all rate classes, with the exception of Rate 60, was adopted as the 'normal' forecast over the

2019-2024 Rate Review. For Rate 60, JPS’s forecast was accepted because the OUR took the view that JPS had better information on the roll-out of its Smart Streetlight Programme, which involved a technology upgrade. The CAGR for the ‘normal’ forecast based on the blend of the two forecasts was 1.2%.

- 6.19.3. With the advent of COVID-19 and the government’s efforts to contain the spread of the pandemic, which commenced 2020 mid-March, it was evident that the ‘normal’ forecast was no longer plausible. The government’s pandemic containment measures included lockdowns, curfews, travel bans and quarantines. These measures, coupled with a general contraction in the global economy, had significant economic and social consequences that translated to an overall reduction in electricity demand.
- 6.19.4. Emerging from the dialogue between the OUR and JPS regarding the reasonableness of the forecast, the ‘final’ forecast was established by the OUR based on the following assumptions:
1. The average change in the monthly sales for 2020 July and August relative to the sales performance in the comparable months of the previous year for each customer category would hold for the remaining four months (2020 September to December) of the 2020 calendar year. This was applied to all customer categories except Streetlights (RT60);
 2. One half of the percentage differential between the ‘normal’ sales forecast and the ‘final’ sales forecast for 2020 would be applicable to the sales forecast in 2021;
 3. For all rate classes except Streetlights (RT60), the projected energy sales for 2022 would reflect the 2020 levels in the normal forecast. Similarly, 2023 sales would reflect the 2021 levels and so on;
 4. The RT60 category energy consumption would see no deviation from the normal forecast.
- 6.19.5. The ‘normal’ and ‘final’ sales forecasts for 2020 and 2021 derived from these assumptions are shown in Table 6.17 below.

Table 6.17 - 2019-2024 Determination Notice Normal & Final Sales Forecasts 2020 – 2021

Rate	Adjustment Factor (Differential)		Normal Sales Forecast (GWh)		Final Covid-19 Sales Forecast (GWh)	
	2020	2021	2020	2021	2020	2021
RT10	3.50%	1.75%	1,123	1,144	1,162	1,164
RT20	-8.50%	-4.25%	641	646	586	618
RT40	-8.10%	-4.05%	830	852	763	817
RT50	-11.30%	-5.65%	329	326	292	308
RT60	0.00%	0.00%	48	40	48	40
RT70	-21.30%	-10.65%	274	279	216	249

6.19.6. The resulting final forecast reflected a CAGR of 0.6% over the 2018-2024 period, for total energy sales versus the 1.2% projection in the normal forecast. Table 6.18 shows the final forecast for the entire 2020-2024 period.

Table 6.18 - 2019-2024 Determination Notice Final Covid-19 Sales Forecast 2020– 2024

	Unit	2016	2017	2018	2019	2020	2021	2022	2023	2024	CAGR 2018-2024
Rate 10	GWh	1,079	1,069	1,066	1,102	1,162	1,164	1,123	1,144	1,161	1.4%
Rate 20	GWh	624	639	633	636	586	618	641	646	653	0.5%
Rate 40	GWh	784	786	801	817	763	817	830	852	874	1.5%
Rate 50	GWh	626	572	356	334	292	308	329	326	326	-1.5%
Rate 60	GWh	71	68	62	58	48	40	40	40	41	-6.9%
Rate 70	GWh	-	75	294	272	216	249	274	279	284	-0.6%
EV	GWh	-	-	-	-	0.1	0.1	0.1	0.1	0.2	24.9%
Sales Covid-19	GWh	3,184	3,209	3,212	3,219	3,068	3,197	3,237	3,287	3,338	0.6%
Sales Growth	%		0.8%	0.1%	0.2%	-4.7%	4.2%	1.3%	1.5%	1.6%	

6.19.7. In addition, it was assumed for the KVA demand forecast that the growth in each sub-category customer class would mirror the overall sales growth customer class in the final sales forecast. For example, the overall forecast sales growth for Rate 40 in 2020 was 6.6%. Consequently, the KVA demand for the Rate 40, Standard and TOU subcategories were projected to grow by the same 6.6%. The Final 2020-2024 KVA Demand forecast for the RT40, RT50 and RT70 categories is shown in Table 6.19 below.

Table 6.19 - 2019-2024 Determination Notice Final Covid-19 KVA Forecast 2020 – 2024

	Mode	Unit	2017	2018	2019	2020	2021	2022	2023	2024	CAGR 2018- 2024
Rate 40	STD	KVA	2,244,666	2,308,764	2,346,563	2,191,491	2,346,352	2,384,648	2,445,390	2,509,464	1.4%
	TOU-off Peak	KVA	305,174	300,993	312,382	291,738	312,354	317,452	325,538	334,068	1.8%
	TOU-part Peak	KVA	298,247	295,640	306,053	285,828	306,026	311,021	318,943	327,300	1.7%
	TOU-on Peak	KVA	235,148	240,386	245,061	228,867	245,039	249,039	255,382	262,074	1.5%
	Total	KVA	3,083,235	3,145,783	3,210,059	2,997,924	3,209,771	3,262,159	3,345,254	3,432,906	1.5%
	Growth Rate	%	0.0%	1.9%	2.0%	-6.6%	7.1%	1.6%	2.5%	2.6%	
Rate 50	STD	KVA	701,170	661,530	624,098	545,206	575,009	614,663	609,442	608,324	-1.4%
	TOU-off Peak	KVA	198,907	193,146	179,555	156,857	165,432	176,840	175,338	175,017	-1.6%
	TOU-part Peak	KVA	185,127	177,365	166,016	145,030	152,958	163,506	162,118	161,820	-1.5%
	TOU-on Peak	KVA	136,969	129,599	122,084	106,852	112,482	120,239	119,218	118,999	-1.4%
	Total	KVA	1,222,173	1,161,640	1,091,754	953,745	1,005,881	1,075,248	1,066,116	1,064,159	-1.5%
	Growth Rate	%	0.0%	-37.9%	-6.0%	-12.6%	5.5%	6.9%	-0.8%	-0.2%	
Rate 70	STD	KVA	639,842	604,690	587,001	465,207	538,413	591,114	602,588	613,166	0.2%
	TOU-off Peak	KVA	121,649	146,040	126,259	100,062	115,808	127,144	129,612	131,887	-1.7%
	TOU-part Peak	KVA	119,705	145,522	125,098	99,142	114,743	125,975	128,420	130,674	-1.8%
	TOU-on Peak	KVA	101,808	125,316	107,126	84,899	98,259	107,877	109,971	111,901	-1.9%
	Total	KVA	983,004	1,021,568	945,484	749,311	867,223	952,110	970,591	987,628	-0.6%
	Growth Rate	%	0.0%	293.7%	-7.4%	-20.7%	15.7%	9.8%	1.9%	1.8%	
	Total	KVA	5,288,412	5,328,991	5,247,298	4,700,980	5,082,875	5,289,518	5,381,961	5,484,693	0.5%
	Growth Rate	%	0.0%	0.8%	-1.5%	-10.4%	8.1%	4.1%	1.7%	1.9%	

6.19.8. Notwithstanding the modified forecast which sought to incorporate the effects of COVID-19 on energy sales and KVA demand, the OUR recognized the challenges of producing accurate projections for an event that has no comparable historical precedence. In light of this, the OUR decided in Determination #24 of the 2019-2024 Determination Notice that “[g]iven the uncertainties associated with forecasting demand in light of the Covid-19 pandemic, the OUR shall revisit the demand forecast in the 2021 Annual Review with a view of fine-tuning the projections.”

6.20 The Actual 2020 Performance

6.20.1. A review of JPS’s billing determinants shows that overall sales fell by 7.1% in 2020 when compared with 2019. Further, an analysis of the 2020 forecast versus the overall actual sales indicates that sales fell short of the forecast by 4.2%.

6.20.2. In all instances, except for Rate 60 and Rate 70, the forecast overestimated actual sales performance. The Rate 50 category, with a negative variance of 21.9%, accounted for the largest deviation and the Rate 10 class with a variance of -2.0%, registered the lowest. As shown in Table 6.20 below, the forecast underestimated the actual performance of Rate 60 and Rate 70 by 8.3% and 4.6% respectively.

Table 6.20 - 2020 Actual Sales Performance versus Forecast

	Actual		Forecast	Growth	Forecast Variance
	2019	2020	2020	2020 vs. 2019	2020 vs. 2019
	(GWh)	(GWh)	(GWh)	(GWh)	(GWh)
Rate 10	1,101	1,139	1,162	3.5%	-2.0%
Rate 20	638	554	586	-13.2%	-5.5%
Rate 40	798	740	763	-7.3%	-3.0%
Rate 50*	281	228	292	-18.9%	-21.9%
Rate 60	59	52	48	-11.9%	8.3%
Rate 70	288	226	216	-21.5%	4.6%
Total	3,165	2,939	3,067	-7.1%	-4.2%

**Excluding Caribbean Cement Co. sales*

6.21 Energy Sales Forecast 2021

Economic Overview

- 6.21.1. Undoubtedly, the COVID-19 pandemic has had a significant impact on Jamaica’s economy. According to STATIN, Jamaica's economy contracted by **9.9%** in 2020 relative to 2019. This was mainly due to a decline in both the goods-producing industry and service industry by 4.5% and 11.8% respectively.
- 6.21.2. Within the service industry, hotels and restaurants recorded the largest decline of 53.8% in 2020 when compared to 2019. This was due to a reduction in tourist arrivals by 67.9% (i.e. 798,290 in 2020 from 2,483,169 in 2019). On the other hand, the mining and quarrying industry recorded the largest decline in the goods-producing sector and the second-largest decline overall (21.5%). This was mainly due to a decline in alumina production by 25.4% in 2020.
- 6.21.3. According to the Planning Institute of Jamaica (PIOJ), the economy declined by 5.7% in the first quarter of 2021 relative to the corresponding quarter in 2020. This was mainly attributed to a decline of 8.1% in the service industry, which outweighs a growth of 3.0% in the goods-producing industry. It is against this backdrop that it has become necessary to revise the 2021 forecast.

JPS’s Demand Forecast 2021

- 6.21.4. In keeping with the OUR’s Determination in the 2019-2024 Determination Notice that the demand forecast for 2021 should be reviewed in light of the imponderables associated with COVID-19, JPS submitted an initial forecast for 2021 in its Annual Review Application. Although JPS did not explicitly state the methodology used, subsequent discussions revealed that the company used the auto-regressive integrated moving average (ARIMA) model approach, which it suggested was augmented by market intelligence. As shown in Table 6.21 below, JPS initially projected overall energy sales to grow by 2.5% with the Rate 70 category projected to grow by 9.7% (the highest margin) and the Rate 60 class to decline by 5.8%. Overall growth in demand for the large commercial and industrial customers, as projected by

JPS, is 2.7%. JPS estimated that overall customer count will move from 610,210 to 617,023, a 1.1% increase of the actual count for 2020.

Table 6.21 - JPS's Initial 2021 Forecast against Actual 2020 Figures

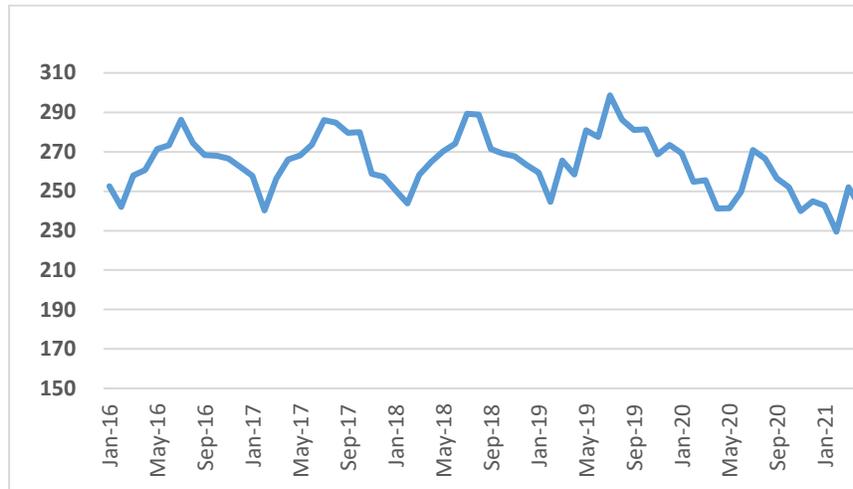
	Energy Sales			Demand			Customer Count		
	Actual	Forecast	Expected Growth	Actual	Forecast	Expected Growth	Actual	Forecast	Expected Growth
	2020	2021	2021 vs. 2020	2020	2021	2021 vs. 2020	2020	2021	2021 vs. 2020
	(GWh)	(GWh)	(GWh)	(MVA)	(MVA)	(MVA)			
Rate 10	1,139	1,152	1.1%				610,210	617,023	1.1%
Rate 20	554	560	1.1%						
Rate 40	740	765	3.4%	3,060	3,097	1.2%			
Rate 50*	228	238	4.4%	1,121	1,137	1.4%			
Rate 60	52	49	-5.8%						
Rate 70	226	248	9.7%	1,131	1,223	8.1%			
All Non-Residential							72,014	72,414	0.6%
Total	2,939	3,012	2.5%	5,312	5,457	2.7%	610,210	617,023	1.1%

*Excluding Caribbean Cement Co. sales

Methodology

- 6.21.5. Figure 6.1 below shows a time series of total energy consumed by JPS's customers from 2016 January to 2021 April. This series fluctuated with high levels of seasonality. Given the uncertain conditions under which the forecast must be done, arguably, the auto-regressive integrated moving average (ARIMA) model is best suited for the exercise.
- 6.21.6. The ARIMA methodology is advantageous because a large span of time series data is available and provides a better understanding of time series patterns. Secondly, with so little understanding of the relationship between the variables impacted by the pandemic, the methodology circumvents the problems associated with multi-variate models. Further, the methodology provides a more robust estimate when compared to a constant increase. In light of the fact that ARIMA models are suitable for non-stationary time series, they should deliver stable and relatively accurate short to medium-term forecasts.

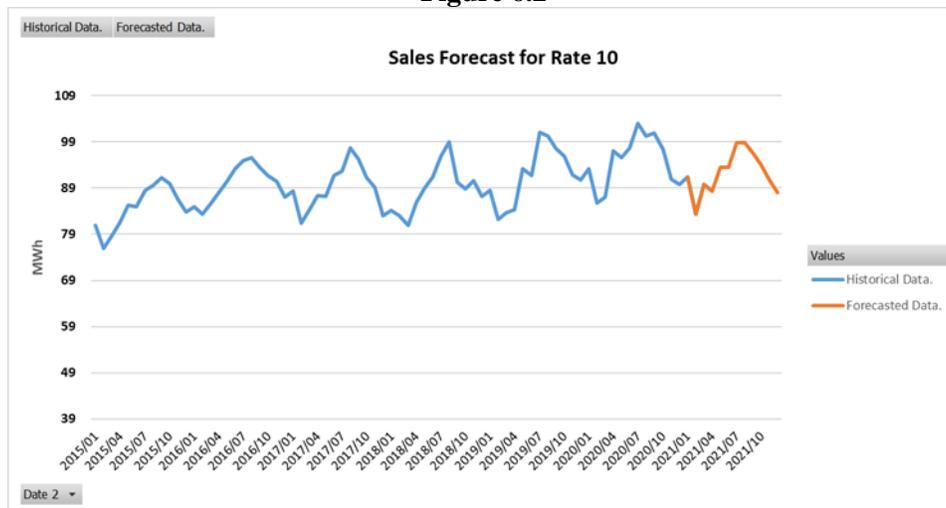
Figure 6.1 - Energy Sales for JPS from 2016 January to 2021 April



6.22 Residential (RT10) Forecast

6.22.1. The graph (Figure 6.2) below shows a time series of energy consumed by residential customers from 2015 to 2021. This series fluctuated with high levels of seasonality. Energy consumed by residential customers increased from **1,016 MWh in 2015** to **1,138 MWh in 2020**, representing a **12.0%** increase over the period.

Figure 6.2



6.22.2. Initially, OUR forecast 2020 and 2021 Rate 10 sales to approximately **1,123** and **1,144 MWh** respectively. This was the arithmetic average of the OUR’s Final Criteria forecast and JPS’s initial forecast. After the corona virus outbreak, the OUR increased the Rate 10 forecast for 2020 by 10% and the forecast for 2021 by 5%. This adjustment was done after the Government and several private organizations implemented a work-from-home protocol and a curfew schedule, which would ultimately increase the amount of energy consumed by

residential customers. It was also assumed that the effects that COVID-19 had on residential customer consumption would phase out by 2022.

- 6.22.3. After 2020, the OUR adjusted the 2021 forecast with actual COVID-19 energy consumption data points. The main drawback of the original approach was addressing the question "How to properly distribute this 5% increase across the months in 2021?" The OUR reviewed its initial adjustment strategy and then implemented a time series approach (ARIMA models) instead of a constant increase of 5%. This methodology (ARIMA) would provide a more robust estimate when compared to a constant increase. ARIMA models are suitable for non-stationary time series. They also provide stable and high accuracy short to medium-term forecasts. In addition, these models also provide a better understanding of time series patterns.
- 6.22.4. Using the ARIMA model, we expect energy consumption by residential customers to decline by approximately 2.9% (1,106 MWH) in 2021 when compared to 2020 (1,138 MWH). Table 6.22 below shows the monthly breakdown.

Table 6.22 - 2021 Residential Sales Forecast

Sales Forecast for Rate 10			
Month	2020	2021	Y.O.Y Change
January	93,125	91,455	-1.79%
February	85,706	83,329	-2.77%
March	87,119	89,716	2.98%
April	97,081	88,284	-9.06%
May	95,638	93,515	-2.22%
June	97,745	93,532	-4.31%
July	102,938	98,745	-4.07%
August	100,220	98,776	-1.44%
September	100,979	96,577	-4.36%
October	97,384	93,897	-3.58%
November	90,863	90,761	-0.11%
December	89,860	87,966	-2.11%
TOTAL	1,138,658	1,106,553	-2.82%

6.22.5. A 2.9% decline in Rate 10 energy consumption for 2021 can be backed by two points:

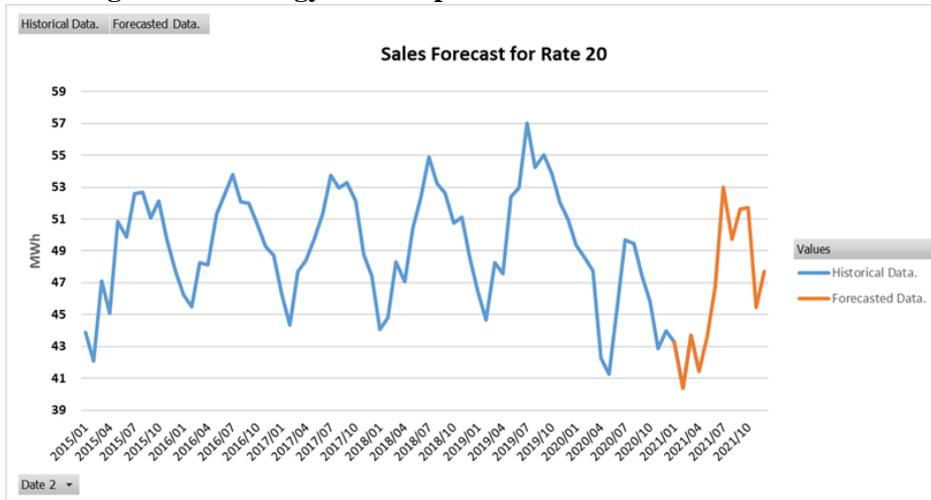
1. The Jamaican economy is gradually returning to normal (i.e. reduced curfew hours and resumption of working in the office).
2. A negative correlation between electricity consumption and oil price (approx. 0.35). Oil price is expected to increase throughout 2021.

6.23 Small Commercial & Industrial (RT10) Forecast

6.23.1. Figure 6.3 below shows a time series of energy consumption by general service customers (Rate 20). Energy consumption fluctuated over the review period (2015-2020) with some level of seasonality. Rate 20 sales decreased by approximately 5.3% over the review period (2015 to 2020). The measures put in place to limit the spread of COVID-19 negatively

affected the energy consumption of this rate class. Sales declined by **31.8%** in **2020 (554 MWh)** when compared to **2019 (811MWh)**.

Figure 6.3 - Energy Consumption - RT20 Customers 2015-2021



- 6.23.2. OUR’s initial 2021 forecast for Rate 20 sales was **646 MWh**. This forecast was reduced by **5%** to account for the effects of the COVID-19 pandemic. The rationale for reducing this forecast was due to measures including restricted movement and reduced business hours put in place by the Government to control the spread of the virus.
- 6.23.3. Taking into consideration recent data points that account for the pandemic, an ARIMA model was also used to predict 2021 energy consumption for general service customers. Results from the ARIMA model showed energy consumption is expected to decline by **3.4%** in **2021** relative to **2020**. However, the results from the model were adjusted by squaring the movement of 2018/19 for the months of June to December, and this was multiplied by the forecast results of these corresponding months, to get a final forecast. After applying these adjustments, Rate 20 sales are expected to increase by **0.8%** when compared to **2020**. The main reason for this adjustment is the revised curfew hours, which implies that small businesses may remain open for relatively longer periods, hence, consuming more electricity.
- 6.23.4. Table 6.23 below shows a monthly break-out of the expected energy consumption for 2021 relative to 2020.

Figure 6.4 - Energy Sales Forecast for JPS's RT40 Customers from Historical Data

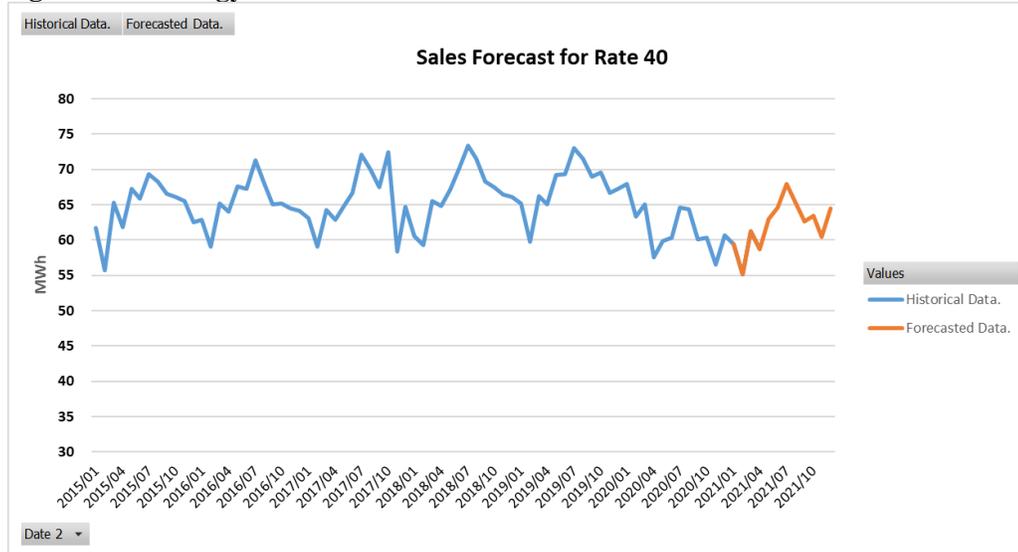


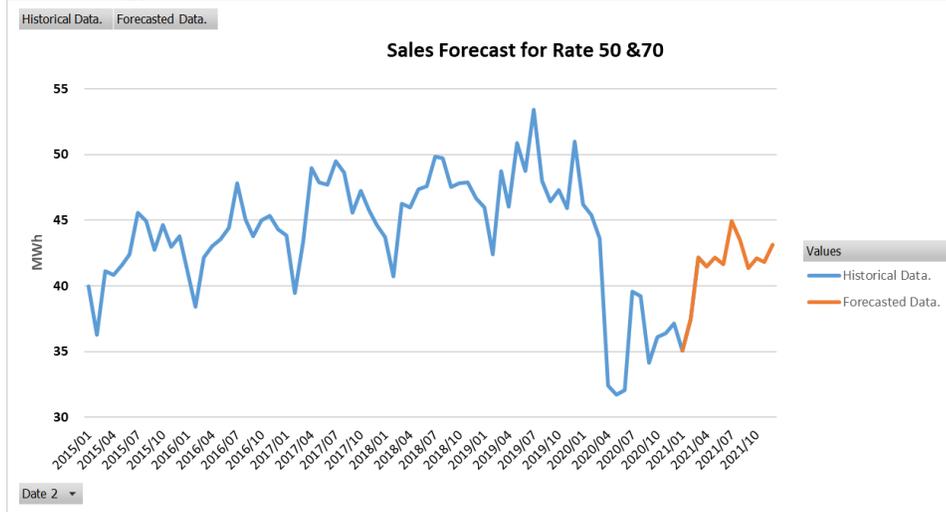
Table 6.23 - 2021 Small Commercial & Industrial Sales Forecast

Sales Forecast for Rate 40				
Month	2020	2021	Y.O.Y Change	
January	67,909	59,389	-12.55%	
February	63,298	55,198	-12.80%	
March	65,057	61,261	-5.83%	
April	57,569	58,671	1.91%	
May	59,840	62,966	5.22%	
June	60,352	64,646	7.12%	
July	64,648	67,896	5.02%	
August	64,347	65,299	1.48%	
September	60,131	62,681	4.24%	
October	60,301	63,485	5.28%	
November	56,579	60,395	6.74%	
December	60,647	64,461	6.29%	
TOTAL	740,678	746,348	0.77%	

6.24 Large Commercial & Industrial (RT40) Forecast

6.24.1. Until 2017, the Rate 70 customer category did not exist as a distinct group. Prior to 2017, Rate 70 customers were a part of the Rate 50 class. Consequently, a sufficiently long enough time series does not exist to facilitate a proper analysis of the Rate 70 category. In this regard, the historical sales data for Rates 50 & 70 were aggregated and a single ARIMA model was constructed for these two rate classes as shown in Figure 6.5 below.

Figure 6.5 - Energy Sales Forecast for JPS's RT50 & RT70 Customers from Historical Data



6.24.2. Arising from the ARIMA analysis, energy consumption for the combined Rate 50 and Rate 70 classes is expected to grow by approximately **9.46%** in 2021 relative to 2020. Table 6.24 below shows a monthly breakout of the OUR's forecast relative to 2020 actuals.

6.24.3. Although the RT50 & RT70 large commercial and industrial customers were analyzed as a single block, they were separated into RT50 and RT70 in the ratio of 50%: 50%. This ratio reflects the average actual ratio energy sales between these customer category for 2019 and 2020.

6.24.4. **Table 6.24 - 2021 Large Commercial & Industrial Sales (RT50 & RT70) Forecast**

Sales Forecast for Rate 50 & 70			
(MWh)			
Month	2020	2021	Y.O.Y Change
January	46,186	35,086	-24.03%
February	45,396	37,477	-17.44%
March	43,605	42,190	-3.24%
April	32,401	41,496	28.07%
May	31,706	42,168	33.00%
June	32,093	41,619	29.69%
July	39,545	44,953	13.68%
August	39,228	43,479	10.84%
September	34,134	41,357	21.16%
October	36,082	42,090	16.65%
November	36,396	41,797	14.84%
December	37,151	43,158	16.17%
TOTAL	453,922	496,870	9.46%

6.25 Demand Forecast (KVA)

6.25.1. In developing the OUR's forecast for the KVA demand for the large commercial and industrial customers (i.e. the RT 40, 50 and 70 classes) the demand was calculated based on the energy sales growth forecast for each class. The result of the KVA demand forecast is shown in Table 6.26.

6.26 Customer Count Forecast

6.26.1. Given that the OUR had access to JPS's customer count as at 2021 May, it was assumed that the customer numbers would remain static for the rest of the year. The OUR's forecast is shown in Table 6.27 below.

6.27 Final Forecast

6.27.1. Arising out of discussions between JPS and the OUR, the final Energy, KVA Demand and Customer forecasts were presented by both. As would be expected, there were differences in the two forecasts. However, in arriving at the Approved Energy, KVA Demand and Customer forecast for 2021 the OUR and JPS agreed on the application of the following rules for the energy and KVA demand forecast:

6.28 Energy Forecast

6.28.1. JPS's Energy forecast would be accepted if the variance between that and the OUR's forecast for overall sales for the respective category is less than $\pm 3\%$.

6.28.2. The mean of the two Energy forecasts would be employed if JPS's forecasts deviate from that of the OUR's overall Energy forecast in each respective category by an amount greater than $\pm 3\%$.

6.29 Demand Forecast

6.29.1. JPS's Demand forecast would be accepted if the variance between the OUR's forecast for the class sub-category is less than $\pm 3\%$.

6.29.2. The mean of the two Demand forecasts would be employed if the deviation between the Demand forecasts for each sub-category is greater than $\pm 3\%$.

6.30 Customer Forecast

6.30.1. Given that the absolute difference between JPS and the OUR's customer count projections were not significant, JPS's forecasts would be adopted for approval.

6.30.2. Based on the above projections and rules, Tables 6.25 – 6.27 show the Energy, Demand and Customer forecast for 2021. Additionally, the OUR takes the view that its 2022-2024 forecast in the 2019-2024 Determination Notice remains valid. However, it acknowledges that forecasting energy and demand with the uncertainties imposed by COVID-19 is problematic. In light of this, the OUR proposes that JPS submits a 2022 Energy, Demand and Customer forecast in its 2022 Annual Review Application.

Table 6.25 - Approved Energy Forecast Sales for 2021

	Unit	OUR Forecast	JPS Final Forecast	2021 Approved Forecast	Forecast Variance
Rate 10	GWh	1,106.6	1,152.0	1,129.3	4.11%
LV < 100	GWh	536.5	559.7	548.1	
LV > 100	GWh	569.7	592.4	581.1	
Rate 20	GWh	558.5	560.3	560.3	0.33%
Rate 40	GWh	746.3	765.0	765.0	2.50%
Standard	GWh	641.9	652.0	652.0	
TOU	GWh	104.5	113.3	113.3	
Off-Peak	GWh	48.7	53.0	53.0	
Part peak	GWh	44.6	47.8	47.8	
On-Peak	GWh	11.2	12.4	12.4	
Rate 50	GWh	248.4	238.0	243.2	-4.20%
Standard	GWh	203.7	194.3	199.0	
TOU	GWh	44.7	43.8	44.2	
Off-Peak	GWh	19.3	19.1	19.2	
Partial peak	GWh	20.1	17.7	18.9	
On-Peak	GWh	5.3	6.9	6.1	
Rate 60	GWh	47.7	49.0	49.0	2.82%
Streetlight	GWh	46.7	48.8	48.8	
Traffic Light	GWh	0.6	0.6	0.6	
Rate 70	GWh	248.4	248.0	248.0	-0.18%
Standard	GWh	208.7	204.1	204.1	
TOU	GWh	39.7	44.4	44.4	
Off-Peak	GWh	19.1	21.0	21.0	
Partial peak	GWh	15.9	18.0	18.0	
On-Peak	GWh	4.8	5.4	5.4	
Total	GWh	2,955.9	3,012.3	2,994.8	1.91%

Table 6.26 - Approved KVA Demand Forecast for 2021

	Mode	Unit	OUR Forecast	JPS Final Forecast	2021 Approved Forecast	Forecast Variance
Rate 40	STD	KVA	2,188,948	2,294,539	2,241,744	4.8%
	TOU-off Peak	KVA	276,621.7	278,912.3	278,912.3	0.8%
	TOU-part Peak	KVA	284,283	289,791	289,791	1.9%
	TOU-on Peak	KVA	227,594.5	234,204.4	234,204.4	2.9%
	Total	KVA	2,977,447	3,097,446	3,044,651	4.0%
Rate 50	STD	KVA	728,518	680,323	704,421	-6.6%
	TOU-off Peak	KVA	180,901.6	165,474.7	173,188.1	-8.5%
	TOU-part Peak	KVA	179,716	164,984	172,350	-8.2%
	TOU-on Peak	KVA	137,659.6	125,831.3	131,745.5	-8.6%
	Total	KVA	1,226,795	1,136,613	1,181,704	-7.4%
Rate 70	STD	KVA	801,227	783,298	783,298	-2.2%
	TOU-off Peak	KVA	110,951.2	111,089.0	111,089.0	0.1%
	TOU-part Peak	KVA	119,283	119,431	119,431	0.1%
	TOU-on Peak	KVA	104,881.7	105,012.0	105,012.0	0.1%
	Total	KVA	1,136,343	1,118,830	1,118,830	-1.5%
OVERALL		KVA	5,340,585	5,352,889	5,345,185	0.2%

Table 6.27 - Approved Customer Forecast for 2021

	Unit	OUR Forecast	JPS Final Forecast	2021 Approved Forecast	Forecast Variance
Rate 10	No.	610,893	617,023	617,023	1.0%
Rate 20	No.	69,232	69,837	69,837	0.9%
Rate 40	No.	1,891	1,899	1,899	0.4%
Standard	No.	1,783	1,787	1,787	0.2%
TOU	No.	108	112	112	3.4%
Rate 50	No.	149	149	149	0.0%
Standard	No.	127	126	126	-0.9%
TOU	No.	22	23	23	5.2%
Rate 60	No.	483	504	504	4.4%
Streetlight	No.	178	188	188	5.4%
Traffic Light	No.	305	317	317	3.9%
Rate 70	No.	24	24	24	0.0%
Standard	No.	21	20	20	-2.8%
TOU	No.	3	4	4	19.3%
Total	No.	682,672	689,437	689,437	1.0%

7 H-Factor and Fuel Cost Adjustment Mechanism

7.1 Introduction

7.1.1. Schedule 3 of the Licence 2016 requires the OUR to determine an H-Factor, if applicable, to reflect the Heat Rate as defined by the OUR (thermal, system, individual JPS plants, or other methodology) that is associated with the system's electricity generation versus the pre-established yearly targets in the 5-year Rate Review Determination. The relevant Heat Rate target is applied to the monthly Fuel Rate adjustment for each billing month during the applicable Annual Review adjustment period, in accordance with the provisions of Exhibit 2 of the Licence 2016, which details the Fuel Cost Adjustment Mechanism (FCAM). Specifically, for this 2021 Annual Review, the Heat Rate target would be applicable to the 2021 July to 2022 June rate adjustment period.

7.2 Regulatory Principles for Setting Heat Rate Targets

7.2.1. As stated in the 2019-2024 Determination Notice, the Heat Rate target is considered an essential efficiency measure to permit the efficient pass-through of fuel costs incurred by JPS, to its customers. The target is set by the OUR on a periodic basis to ensure that ratepayers are provided with reasonable, prudent and efficient Fuel Rates. In addition to the efficiency improvement goals, 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 reference to these broad 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 energy efficiency (EE) improvements.
- 5) The targets should be reasonable, achievable, and consistent with the configuration/capability of the system during the target period.

7.3 Regulatory Objectives and Approach

7.3.1. A comprehensive Heat Rate evaluation/analysis was conducted by the OUR during the 2019-2024 Rate Review Process. However, the OUR being mindful of the time of publication of the 2019-2024 Determination Notice, has recognized that there are a number of system developments since 2020 that have signaled the need for a full evaluation of the generation system orientation and operations, and Heat Rate performance over the 2021-2022 rate adjustment period. The mentioned system developments since 2020 include:

- Reported commercial operations of the major generation plants added to the system between fourth quarter of 2019 and the first quarter of 2020 (SJPC 190MW and NFE 94MW) for more than twelve (12) months, would allow for an accumulation of actual

plant performance data, including Heat Rate data, since the respective plants' commercial operations date (COD).

- Committed generation capacity scheduled for commissioning in 2021 (JPS/CB 10MW CHP DG facility), which could impact the generation dispatch process, Heat Rate performance and overall system fuel cost.
- Implementation of transmission and distribution (T&D) projects in 2020, which would have resulted in some changes to the system configuration, which has implications for the generation dispatch process.

7.3.2. Given these factors, a comprehensive Heat Rate evaluation covering the 2021-2022 review period is considered critical for ensuring that the fuel-related costs (used for electricity production) to be recovered from ratepayers, during the subject period, are efficient and reasonable. The scope of this Heat Rate evaluation is outlined below.

7.4 Scope of Heat Rate Evaluation/Review

7.4.1. The OUR's Heat Rate evaluation for this 2021-2022 Annual Review encompasses, among other things, the following activities:

- Technical evaluation of JPS's 2021-2022 Heat Rate proposals (including all supporting schedules and data submitted by JPS up to 2021 June 11), using the OUR's power system analysis models;
- Scenario analysis to assess the effects of potential variations in JPS's thermal generating plants performance, and the impact of credible system operating constraints during the subject rate adjustment period;
- Review of pre-established 2021-2022 Heat Rate target and reset target if necessary; and
- Review of the approved Heat Rate methodology, H-Factor and FCAM.

7.5 Licence Requirements Applicable to Heat Rate and FCAM

7.5.1. For reference, the provisions of the Licence 2016 applicable to the H-Factor are covered under Schedule 3 (paragraphs 37, 39, 40, 46 b. and Exhibit 2). The Licence 2016 provisions as per the references cited are highlighted in Figure 7.1 below.

Figure 7.1 - Licence Provisions - Heat Rate Target, H-Factor and FCAM

SCHEDULE 3 OF JPS 2016 ELECTRICITY LICENCE: HEAT RATE REQUIREMENTS	
Targets (Paragraph 40)	
40. 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.	
H Factor (Paragraph 46)	
46. The Office shall apply the following adjustment factors to the non-fuel rate at each PBRM:	
b. The <u>H-Factor</u> , if applicable, will reflect the heat rate as defined by the Office of the power generated in Jamaica versus a pre-established yearly target in the 5 year rate setting determination by the Office.	
Exhibit 2	
EXHIBIT 2	
Monthly Adjustment to the Rates	
<i>A. Alternative 1 Fuel Cost Adjustment Mechanism</i>	
The cost of fuel per kilo-watt-hour 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 previous 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
S _m	= the kWh sales in the Billing Period.

7.6 Approved Heat Rate Target and FCAM

Pre-established 2021-2022 Heat Rate Target

7.6.1. In the 2019-2024 Determination Notice, the Office approved a 12-month Heat Rate target of 9,667 kJ/kWh for JPS’s thermal generation plants, which is to be applied as an efficiency measure (subject to any revision) in the defined FCAM over the 2021-2022 review period, as represented in Table 7.1 below.

Table 7.1 - OUR’s Pre-established 2021-2024 Heat Rate Target for JPS

OFFICE APPROVED 2021-2022 HEAT RATE TARGETS FOR JPS: 2019-2024 DETERMINATION NOTICE				
Annual Review Year	Heat Rate Modality	OUR Approved Heat Rate Target (kJ/kWh)	Rate Adjustment Period	Remarks
2021	JPS Thermal Plants	9,667	2021-2022	12-month target – applied each billing month in 2021-2022 review period
2022	JPS Thermal Plants	9,495	2022-2023	
2023	JPS Thermal Plants	9,470	2023-2024	

7.6.2. As articulated in the 2019-2024 Determination Notice, these targets were set in keeping with the requirements of the Licence 2016 and established regulatory precedence, and will be reviewed by the Office at each applicable Annual Review during the 2019-2024 Rate Review period, to account for efficiency improvements and factors outside the control of the company.

7.7 Approved FCAM for the 2019-2024 Rate Review Period

7.7.1. In the 2019-2024 Determination Notice, the Office in keeping with the provisions of Schedule 3 (paragraph 40) of the Licence 2016, determined that the Heat Rate targets shall be based on a “thermal plant methodology” (JPS’s thermal plants) for the purpose of determining the applicable H-Factor. With the H-Factor aligned to a thermal plant Heat Rate methodology, the Licence 2016 provisions would dictate that the appropriate FCAM that would be applicable for fuel cost recovery during each rate review period would be the option defined as “Alternative 1” under Schedule 3 (Exhibit 2) of the Licence 2016. On that basis, the OUR determined that the FCAM to be utilized by JPS for monthly Fuel Rate adjustments over the 2020-2024 regulatory period shall be the formula defined in Figure 7.2 below.

Figure 7.2 - Office Approved FCAM for the 2019-2024 Review Period

$$\text{Allowed Fuel Cost} = \text{IPPs Fuel Cost} + \left[\text{JPS Fuel Cost} \times \text{H-Factor [Thermal]} \right]$$

[OUR Approved FCAM: (2020 - 2024)]

Where: $H\text{-Factor (thermal)} = [\text{JPS Heat Rate Target (thermal)}] / [\text{JPS Heat Rate Actual (thermal)}]$

7.7.2. Notably, this fuel cost adjustment formula 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. With respect to actual Heat Rate performance, the embedded incentive mechanism innately delivers financial benefits or penalties to the extent that there is any over-achievement or under-achievement of the determined Heat Rate targets respectively.

7.8 Overview of Generation System Performance (2015-2020)

Energy Supply Mix

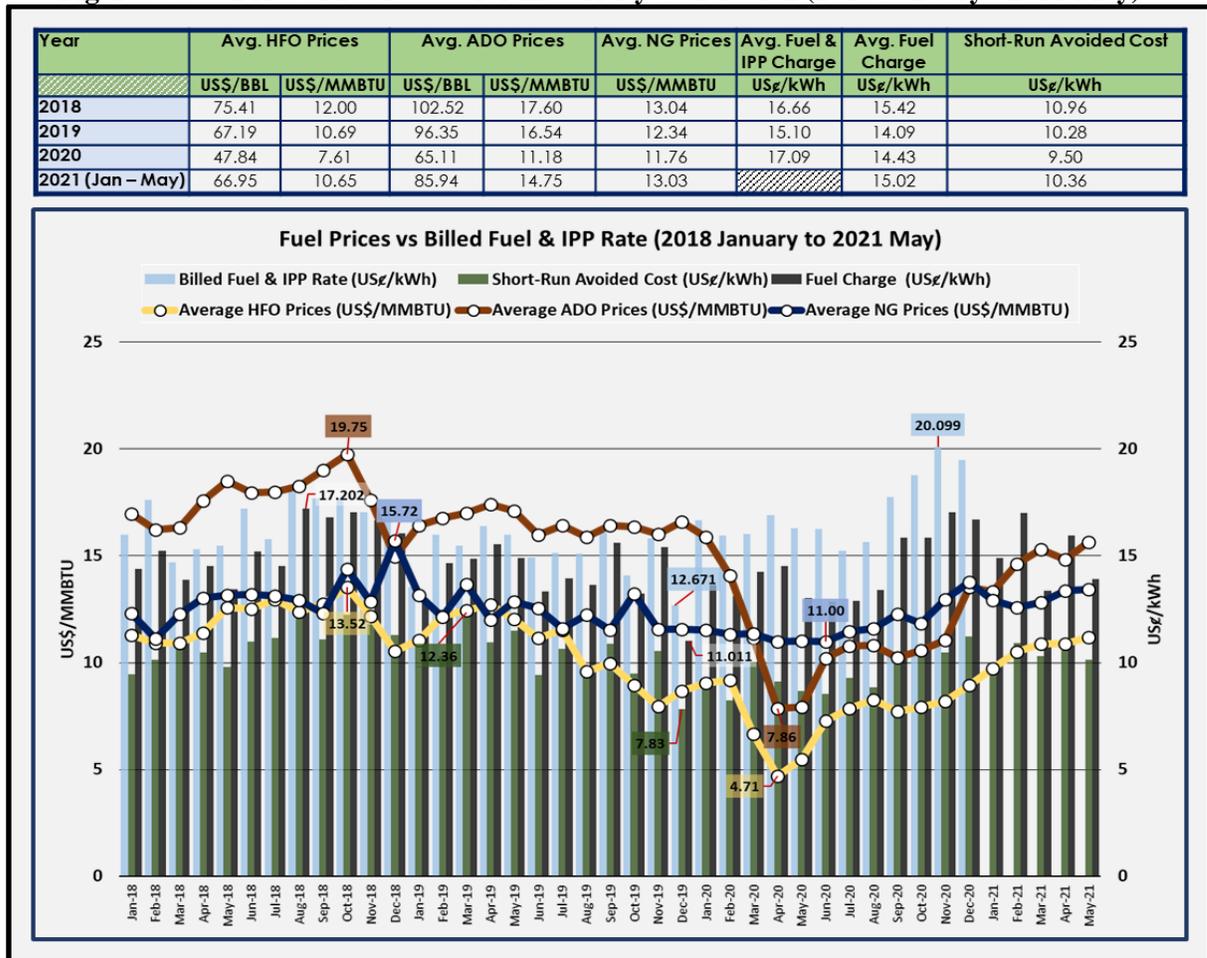
7.8.1. Based on the existing energy statistics, the primary energy sources being used for electricity production to supply the power grid are: Natural Gas (NG), Heavy Fuel Oil (HFO), Automotive Diesel Oil (ADO), and Renewable Energy (RE) sources.

Fuel Price Dynamics

7.8.2. Despite the energy diversification strategy articulated in the National Energy Policy (NEP), the electricity sector remains largely dependent on imported fossil fuels (fuel oil and NG) for electricity production. Although there may be less exposure with the existing primary energy supply matrix, there are still embedded risks. With respect to the petroleum-based fuels, their prices are directly linked to international oil markets, characterized by price volatility and unpredictability. In the case of NG, although international fuel markets also influence the commodity, the pricing mechanisms in the existing gas supply agreements (GSAs), appear to provide for more stable prices. Nevertheless, based on the fuel supply logistics and market conditions, the prices of these fuels are largely outside the control of JPS and the respective IPPs.

7.8.3. During the 2018 January - 2021 May timeframe, the fuel prices have fluctuated significantly, as shown in Figure 7.3 below. The chart captures the relative movement in the monthly fuel prices over the period, with the highest recorded average monthly price for each fuel type indicated. Over the period, the average price of HFO supplied to JPS's generating plants, fluctuated heavily within the range of US\$29.6/Barrel to US\$85.0/Barrel, which was reflected in the monthly Fuel Rates used for billing and fuel cost recovery. Similarly, ADO prices also varied widely between a low of US\$45.8/Barrel and a high of US\$115.0/Barrel. In contrast, plant gate prices for NG has been steady in the US\$12-13/MMBTU range during the period.

Figure: 7.3 - Price of Fuels used for Electricity Generation (2018 January - 2021 May)



7.8.4. Based on the relationship between input fuel prices and Fuel Rates, the effects of fuel price variations are usually manifested in the monthly Fuel charges calculated by JPS for billing purposes.

7.9 System Fuel Cost

7.9.1. Based on JPS’s Fuel Reports, the total annual fuel cost incurred from the use of HFO, ADO and NG, for grid electricity generation during the period 2018 – 2020 are provided in Table 7.2 below.

Table 7.2 - System Fuel Cost by Fuel Type (2018 - 2021 May)

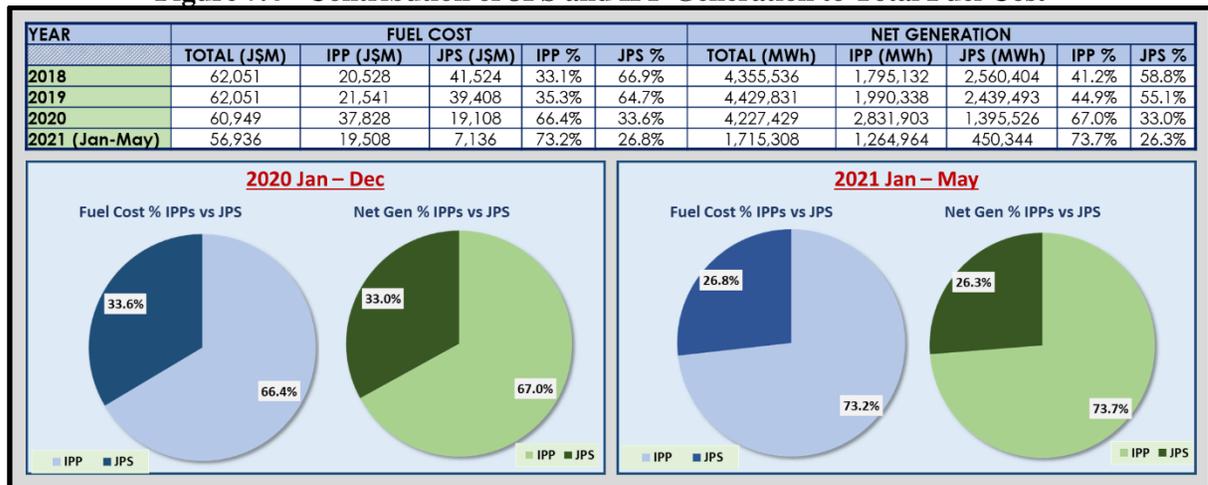
SYSTEM FUEL COST BY FUEL TYPE 2018 – 2021 MAY					
Year	HFO (J\$M)	ADO (J\$M)	NG (J\$M)	Total (J\$M)	NG Cost % of Total
2018	45,573	3,187	13,291	62,051	21.4%
2019	40,937	3,659	16,353	60,949	26.8%
2020	13,931	1,183	41,822	56,936	73.5%
2021 (Jan-May)	5,979	297	20,369	26,645	76.4%

7.9.2. The data indicates that for 2020, total annual NG cost accounted for over 70.0% of system total fuel cost. This outcome was largely expected because of the addition of the South Jamaica Power Company (SJPC) (190MW) and New Fortress Energy (NFE) (94MW) generation facilities (NG-fired plants) to the system between the fourth quarter of 2019 and the first quarter of 2020.

7.10 JPS’s and IPPs’ Contribution to System Generation and Total Fuel Cost

7.10.1. Based on historical generation data, prior to 2020, the proportions of the system’s annual total fuel costs attributable to JPS and IPPs were approximately 65% and 35% respectively, as indicated in Figure 7.4 below. However, as the data indicates, by the end of 2020, this profile had effectively been reversed, with the IPPs component at 66%, and likely to be higher by the end of 2021. This is mainly due to the large displacement of fuel oil-based electricity generation by new large-scale generation facilities operating on NG. In terms of actual costs, for 2020, this allocation translates to average annual fuel costs of approximately US\$19.108B and US\$37.828B, attributable to JPS and IPPs respectively.

Figure 7.4 - Contribution of JPS and IPP Generation to Total Fuel Cost

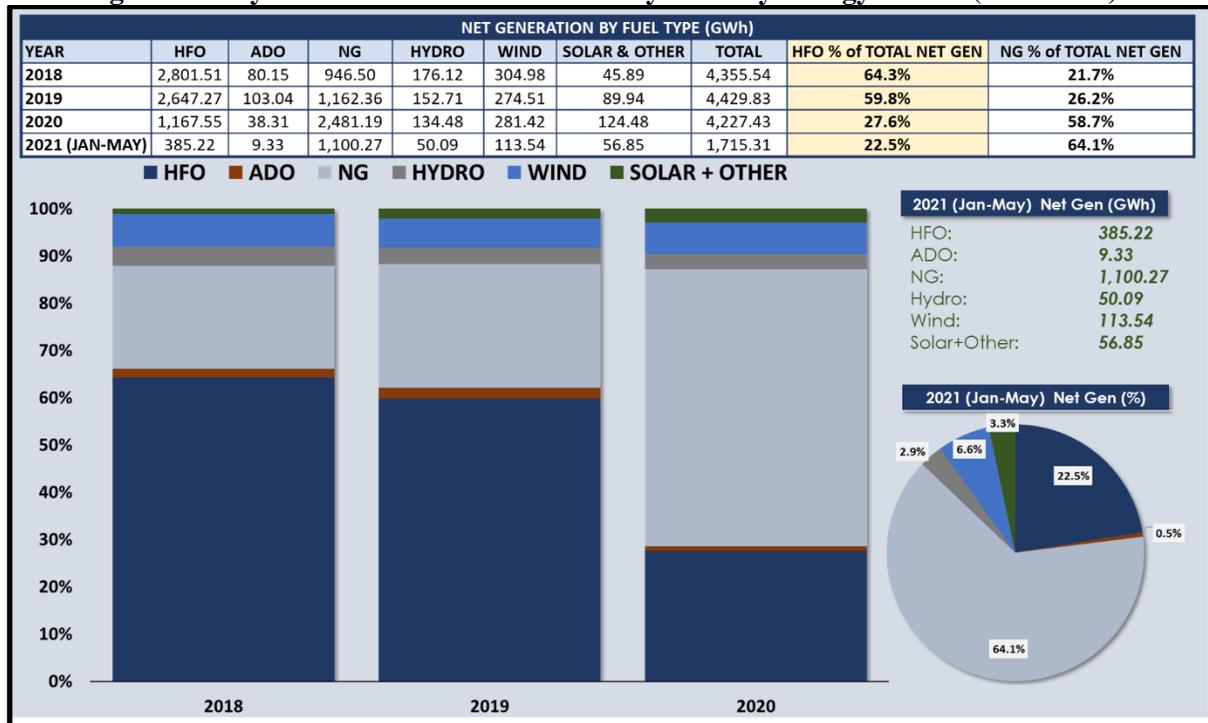


7.10.2. With respect to the system annual net generation, for 2020, the contributions from JPS plants and IPP facilities accounted for approximately 33% and 67%, respectively, indicating that the coverage of the system load is dominated by IPP plants.

7.11 Net Generation by Fuel Source

7.11.1. The breakdown of the system’s total annual net generation by primary energy sources for 2018 – 2020, is provided in Figure 7.5 below.

Figure 7.5 - System Annual Net Generation by Primary Energy Source (2015-2019)



7.11.2. The annual net generation in Figure 7.5 indicates that at the end of 2020, NG had become the dominant primary energy source used for producing electricity supplied to the grid, consequently, reducing the contribution from HFO in the energy supply mix. As shown in Figure 7.5, NG-based electricity generation accounted for 58.7% of system total net generation for 2020 (2,481.19 GWh). It is notable that this level of NG utilization has already exceeded the proportion specified in the existing National Energy Policy (NEP), for the “Energy Supply Matrix” in 2030. However, this outcome has also introduced the unintended effect of fuel substitution, which is expected to be magnified with future expansion in NG use. This is a pivotal issue that will have to be rationalized going forward.

7.12 Renewable Energy (RE) Generation

7.12.1. With respect to RE generation, at the end of 2020 total net generation from RE sources contributed to approximately 13% of system total net generation. This means that the 2020 RE target of 15% established in the NEP is yet to be achieved.

7.13 Fuel Charge

7.13.1. The Fuel & IPP charge is calculated each month on a US¢/kWh basis by JPS and represents the cost of fuel (JPS and IPPs fuel cost) for producing and supplying each kWh of electricity to the system. The annual average Fuel Charge reported by JPS for the period 2018 January – 2021 May, are presented in Figure 7.4 above. As shown in Figure 7.4, the monthly Fuel & IPP Charge varied significantly from month to month during the 41-month period, with a profile that tends to track the movement in the fuel prices (US\$/MMBTU). Based on JPS’s monthly Fuel Reports, the indicated variations in the Fuel Rate were mainly due to fluctuations in input fuel prices, generation dispatch profile, and electricity sale volumes recorded for each “billing month”. As indicated in Figure 7.3, the highest and lowest Fuel Charge applied over the period, were 20.099 US¢/kWh (2020 November) and 12.671 US¢/kWh (2019 December) respectively. To put things into perspective, the Fuel Charge currently represents approximately 47% of the average residential customer’s electricity bill.

7.14 Net Billing Rate

7.14.1. The “Net Billing Rate” is a volumetric-based rate (US¢/kWh) used for calculating energy payments to Self-generators for excess energy supplied to the grid, subject to a Standard Offer Contract (SOC), under the Net Billing Programme. As with the movement in the monthly Fuel Charge, the Net Billing Rate also exhibited a similar trend over the same period. This is due to the fact that the Net Billing Rates are based on the short-run marginal cost of generation (mainly fuel cost), which is largely influenced by the factors described above.

7.15 Retirement of JPS’s Oil-fired Steam Generation Plants

7.15.1. At the end of 2020 December, JPS officially retired its Hunts Bay (HB) B6 unit (68.5MW), which culminated in the full retirement of the aged/inefficient oil-fired steam generation capacity (292MW). JPS has indicated that given the existing system configuration, with the shutdown of HB B6, the system could be susceptible to load/generation imbalances and generation shortfall in the Corporate Area sub-system as well as Reactive Power/Voltage issues and other system security concerns. Citing these concerns, in 2020, JPS presented a number of mitigation measures to the OUR, which are being considered.

7.16 Review of JPS’s Heat Rate Performance (2018 October – 2021 MAY)

JPS’s Heat Rate Performance (2018 October - 2020 December)

7.16.1. At the 2018-2019 Annual Review, the Office, after evaluating JPS’s proposed 2018-2019 Heat Rate target (11,482 kJ/kWh), determined that the existing Heat Rate target of 11,450 kJ/kWh at the time should remain in effect for the 2018-2019 rate adjustment period (see Table 7.3 below). However, due to the protracted conclusion of the 2019-2024 Rate Review Process, this target was in effect (unadjusted) from 2018 October up to the effective

date of the 2019-2024 Determination Notice. This means that there has been a significant overshoot of the Heat Rate target since the complete retirement of the entire Old Harbour Power Station (OHPS) at the end of 2019 December.

7.17 JPS’s Heat Rate Performance (2021 January – May)

7.17.1. In the 2019-2024 Determination Notice, the Office approved a Heat Rate target for JPS of 9,675 kJ/kWh for H-Factor adjustment to the FCAM during the 2020-2021 review period. A comparison of JPS’s average monthly Heat Rate performance against the target after it was first applied in 2021 January to 2021 May is shown in Table 7.3 below.

Table 7.3 - Summary of JPS’s Heat Rate Performance (2018 October - 2021 May)

JPS’s PROPOSED HEAT RATE TARGETS VERSUS OUR DETERMINED TARGETS (2018 OCT-2020 MAY)						
Period	JPS Proposed Heat Rate Target (kJ/kWh)	Approved Heat Rate Target (kJ/kWh)	Average Actual Heat Rate (kJ/kWh)	Average Difference (Target - Actual) (kJ/kWh)	Benefit /Penalty	Remarks
2018 OCT - 2020 DEC	11,482	11,450	10,792	658	Benefit to JPS	Target applied up to effective date of 2019-2024 DET NOTICE
2021 JAN - 2021 MAY	9,976	9,675	9,482	193	Benefit to JPS	

7.17.2. As indicated in Table 7.3 above, for the period 2021 January – May JPS’s average monthly Heat Rate (actual) was 9,482 kJ/kWh, which represents an average monthly difference relative to the target, of 193 kJ/kWh, in favour of JPS.

Monthly Heat Rate Performance versus Target (2018 October – 2021 May)

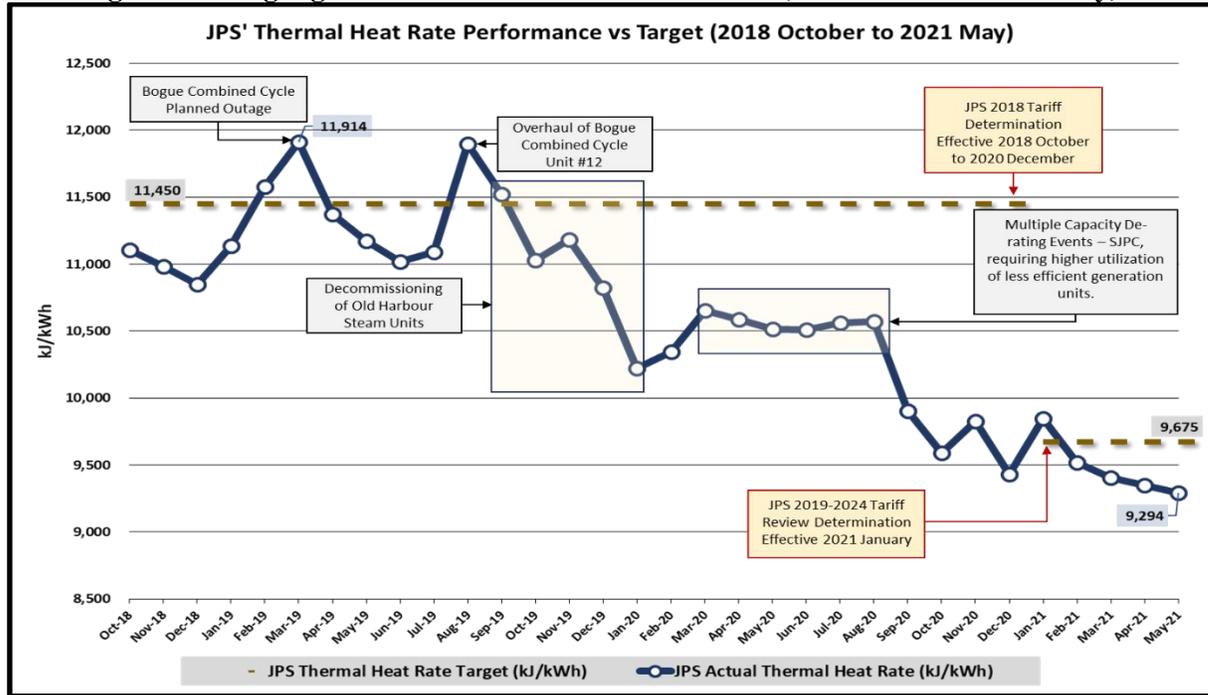
7.17.3. For the monthly Heat Rate performance reported by JPS over the 2018 October – 2021 May period, a detailed comparison of the monthly Heat Rates versus the relevant targets is presented in Table 7.4 below.

Table 7.4 - JPS’s Heat Rate Performance versus Targets (2018 October – 2021 May)

JPS ACTUAL HEAT RATE VERSUS TARGET									
DATE	2018-2019 Heat Rate (kJ/kWh)			2019-2020 Heat Rate (kJ/kWh)			2020-2021 Heat Rate (kJ/kWh)		
	Actual Heat Rate	Heat Rate Target	Variance	Actual Heat Rate	Heat Rate Target	Variance	Actual Heat Rate	Heat Rate Target	Variance
JUL				11,088	11,450	362	10,561	11,450	889
AUG				11,897	11,450	-447	10,569	11,450	881
SEP				11,519	11,450	-69	9,902	11,450	1,548
OCT	11,107	11,450	343	11,028	11,450	422	9,592	11,450	1,858
NOV	10,980	11,450	470	11,184	11,450	266	9,828	11,450	1,622
DEC	10,850	11,450	600	10,823	11,450	627	9,430	11,450	2,020
JAN	11,137	11,450	313	10,223	11,450	1,227	9,846	9,675	-171
FEB	11,579	11,450	-129	10,346	11,450	1,104	9,516	9,675	159
MAR	11,914	11,450	-464	10,652	11,450	798	9,403	9,675	272
APR	11,375	11,450	75	10,587	11,450	863	9,350	9,675	325
MAY	11,173	11,450	277	10,515	11,450	935	9,294	9,675	381
JUN	11,019	11,450	431	10,508	11,450	942	-	-	-
AVG.	11,237	11,450	213	10,864	11,450	586	-	-	-

7.17.4. The data indicates that, on average, the applicable Heat Rate targets were achieved by JPS for the 41 billing months under observation, with significant over-achievement of the target during the period 2019 December – 2020 December, for the reasons described herein. Highlights of the Heat Rate performance analysis during the subject period is illustrated in Figure 7.6 below.

Figure 7.6 - Highlights of JPS's Heat Rate Performance (2018 October – 2021 May)

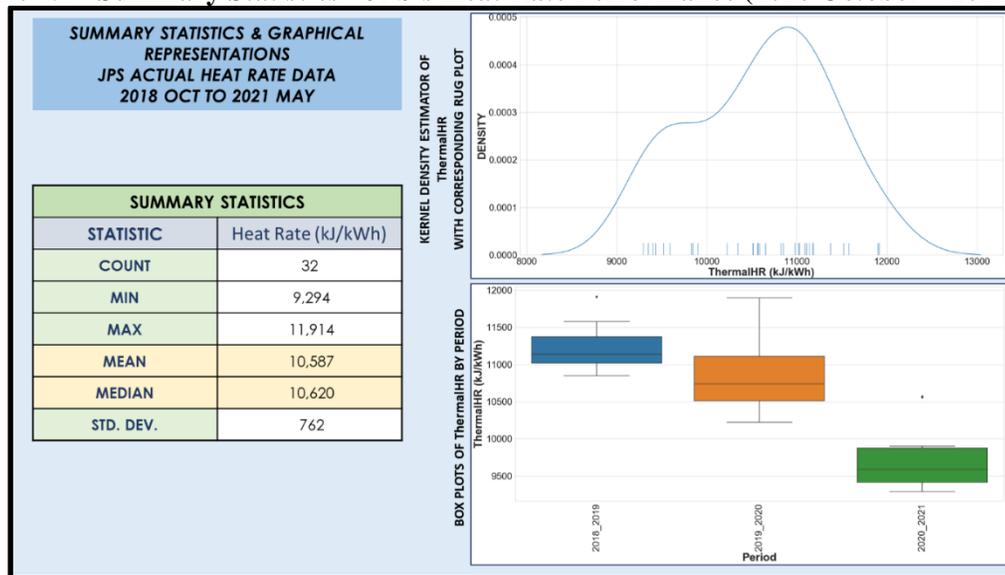


7.17.5. As demonstrated, there were wide variations in the monthly Heat Rates over the period.

Statistical Analysis – Historical Heat Rate Data (2018 October – 2021 May)

7.17.6. In reviewing the 2018 October – 2021 May Heat Rate performance of JPS's thermal plants, the OUR also conducted statistical analysis on the reported Heat Rate data, which yielded the summary statistics presented in Figure 7.7. Figure 7.7 also shows the variation in the reported monthly Heat Rates.

Figure 7.7 - Summary Statistics - JPS's Heat Rate Performance (2018 October – 2021 May)



7.17.7. As indicated, the mean and the median statistic for the Heat Rate distribution (2018 October – 2021 May) show close convergence, inferring that the Heat Rate performance profile over the period is approximately symmetrical, and depicts a normal distribution of the Heat Rate data. The mean Heat Rate over the period is 10,587 kJ/kWh and the standard deviation (STD) is 762 kJ/kWh, which means that 95% of the monthly average Heat Rates are within 2 STDs of the mean value. This analysis validates that the Heat Rate targets set by the Office during the period were reasonable and reside within statistical limits.

Review Summary – JPS Historical Heat Rate Performance

7.17.8. The highlights from the OUR's review of JPS's 2018 October – 2021 May Heat Rate performance are as follows:

- 1) The applicable Heat Rate targets were reasonably achieved, except for five (5) billing months over the 41-month period, highlighted in yellow in Table 7.4 above.
- 2) The addition of SJPC (190MW) generation facility in 2019 December followed by NFE (94MW) CHP plant in 2020 Q1, and the eventual retirement of the JPS OHPS, resulted in a drastic decline in JPS's monthly average Heat Rates.
- 3) Consequently, from 2019 December up to the effective date of the 2019-2024 Determination Notice, JPS benefited from a significant over-achievement of the existing target of 14,450 kJ/kWh, which was in effect from the 2018 Annual & Extraordinary Review Determination Notice until adjusted in the 2019-2024 Determination Notice.

7.18 JPS's 2021 Annual Review Heat Rate Proposals

7.18.1. As stipulated in the Final Criteria (Criterion 14 and ANNEX 4), for the 2019-2024 Rate Review Process and related Annual Reviews, JPS is required to submit its Heat Rate proposals, supported by the required schedules, models and generation system data, for regulatory evaluation and determination. In adherence to these requirements, JPS in the 2021 Annual Review Application, presented its 2021-2022 Heat Rate proposals along with

the associated models, inputs, assumptions and forecasts. The details of the Heat Rate proposal and supporting schedules/data are outlined below.

7.19 JPS's 2021-2022 Heat Rate Proposal Considerations

7.19.1. On the matter of 2021-2022 Heat Rate, in the 2021 Annual Review Application, JPS posited that in the setting of the Heat Rate target, proper consideration must be given to the following:

- The 40-day planned major maintenance outage of Bogue CCGT Steam Turbine unit (ST14);
- The expected effects of the continuing pandemic on the system load demand; and
- The wear due to age and fuel oil issues affecting the Rockfort units and their impact on the performance of the plant.

7.19.2. The OUR notes JPS's proposition for consideration of these issues in the Heat Rate target setting process. However, these factors were taken into account in the OUR's Heat Rate evaluation and determination of the 2021-2022 Heat Rate target during the 2019-2024 Rate Review process. They have again been taken into consideration in the OUR's Heat Rate evaluation and review of the target during this 2021 Annual Review proceeding.

7.20 JPS's 2021-2022 Heat Rate Forecast

7.20.1. Details relating to JPS's Heat Rate projections for the 2021-2022 review period are provided in the sections below.

7.21 JPS's Heat Rate Model

7.21.1. In the 2021 Annual Review Application, JPS indicated that continuing from 2019-2024 Rate Review Process, it has utilized the PLEXOS simulation software to model its generation system operations and forecast its Heat Rate performance for the 2021-2022 rate adjustment period. According to JPS, its Heat Rate modelling process features the following elements:

- The maximum capacity rating (MCR) of each generating unit/facility in the system;
- The forecast net energy output (NEO) and capacity factor (CF) of each generating unit/facility derived from simulated generation dispatch;
- Fuel price forecasts for ADO, HFO and NG for 2019-2024; and
- The average operating Heat Rate of each generating unit/facility to be utilized during the review period.

7.22 Generating Units' NEO and CF Forecast for 2021-2022

7.22.1. As indicated in the 2021 Annual Review Application and supporting data, JPS's 2021-2022 Heat Rate forecast was produced by its Heat Rate Model, using the NEO, CF and average Heat Rate projections of each generating unit planned for operation during the subject period, and other relevant inputs. The 2021-2022 forecast of the generating units' NEO, CF and average Heat Rate, are presented in Table 7.5 below.

Table 7.5 – JPS’s 2021-2022 Forecast of Generating Units’ NEO, CF and Average Heat Rate

JPS FORECASTED PLANT NEO, CAPACITY FACTORS AND HEAT RATES								
OWNER	2021 JULY – 2022 JUNE DATA							
	2019-2024 Rate Review Application				2021 Annual Review Filing			
JPS:	MCR (MW)	NEO (GWh)	CF (%)	Heat Rate (kJ/kWh)	MCR (MW)	NEO (GWh)	CF (%)	Heat Rate (kJ/kWh)
RF1	20.0	147.4	84.14%	9,076	20.00	138.89	78.70%	9,082
RF2	20.0	133.88	76.29%	9,076	20.00	119.84	68.15%	9,097
HBGT5	21.5	8.08	4.32%	14,997	21.50	3.85	2.05%	16,723
HBGT10	32.5	21.8	7.69%	13,207	32.50	14.27	5.10%	15,482
BOGT3	21.5	5.61	2.99%	15,390	21.50	1.88	1.00%	16,971
BOGT6	18.0	0.033	0.02%	8,931	18.00	1.57	1.00%	17,073
BOGT7	18.0	0.139	0.09%	18,217	18.00	1.42	0.85%	15,359
BOGT9	20.0	5.54	3.12%	14,781	20.00	1.77	1.00%	16,208
BOGT11	20.0	86.93	49.61%	11,990	20.00	3.73	2.15%	13,005
BOCCGT	120.0	859.32	82.21%	9,129	120.00	714.84	67.85%	9,784
JPS MUNRO	3.0	3.35	12.79%	-	3.0	3.35	12.90%	-
MGGTY6.3	7.2	44.09	69.71%	-	7.2	13.06	23.75%	-
JPS HYDRO	22.4	97.22	52.44%	-	23.6	128.26	69.95%	-
IPPs:								
JEP	124.36	141.5	13.13%	8,616	124.36	111.3	10.45%	8,616
JPPC	60.0	311.5	59.21%	8,159	60.0	271.45	51.30%	8,321
WKPP	65.5	235.19	41.26%	8,569	65.5	397.38	69.20%	8,569
SJPC	190.0	1347.29	80.94%	8,842	190.0	1189.6	71.35%	8,546
NFE	94.0	466.62	56.68%	10,964	94.0	762.12	92.45%	11,087
WIGTON I	20.0	55.67	31.69%	-	20.0	55.67	31.45%	-
WIGTON II	18.0	55.76	35.29%	-	18.0	55.76	35.60%	-
WIGTN III	24.0	53.86	25.55%	-	24.0	53.86	25.70%	-
BMRJW	34.00	111.93	37.43%	-	36.3	111.93	35.20%	-
CSL	20.00	42.3	24.16%	-	20.0	44.3	24.25%	-
EREC	37.00	63.44	19.59%	-	37.0	63.44	19.70%	-
JPS DG	14.00	95.86	78.25%	-	10.0	75.67	70.00%	-

7.22.2. As shown, some of the parameters, presented in the 2019-2024 Rate Review Application, particularly the dispatch levels and plants’ NEO have been adjusted by a significant degree. However, no clear basis or rationale was offered by JPS to substantiate such noticeable alteration to the data.

7.23 JPS’s Monthly Average Heat Rate Projections (2021-2022)

7.23.1. In the 2021-2022 Annual Review Application, JPS indicated that the Heat Rate performance of its thermal generating plants, over the 2021-2022 review period will depend on several factors affecting economic generation dispatch, including the following:

- 1) Growth in system demand
- 2) Addition of more RE generation
- 3) The addition of new generating units and the installed reserve margin (OUR)
- 4) Heat rate improvements made to existing generating units (JPS)
- 5) Availability and reliability of JPS’s generators (JPS)
- 6) Availability and reliability of IPP generators
- 7) Absolute and relative fuel prices for JPS and the IPPs and the impact on economic dispatch

- 8) Spinning reserve policy (JPS & OUR)
- 9) Network constraints and contingencies (JPS)

7.23.2. Based on the factors listed above, JPS seems to be saying that while they are likely to influence the Heat Rate performance outcome, the company has direct control over only a few. In that regard, JPS stated that the Heat Rate forecast and pre-established target for the 2021-2022 review period should be revised to account for factors outside of its control.

7.23.3. Regarding the 2021-2022 Heat Rate forecast, JPS posited that the assumptions and factors described above were incorporated in its Heat Rate forecasting model to update the respective forecast previously submitted in its 2021-2024 Rate Review Application. The revised 2021-2022 Heat Rate forecast included in the 2021 Annual Review Application, is presented in Table 7.6 below.

Table 7.6 – JPS’s Monthly Heat Rate Projections for 2021-2022

2021-2022 FORECAST: JPS THERMAL PLANTS MONTHLY HEAT RATES (KJ/KWH)													
JPS HEAT RATE (KJ/KWH)	2021 JUL	2021 AUG	2021 SEP	2021 OCT	2021 NOV	2021 DEC	2022 JAN	2022 FEB	2022 MAR	2022 APR	2022 MAY	2022 JUN	AVG
2019-2024 RATE REVIEW	9,304	9,309	9,287	9,346	9,327	9,343	9,357	10,516	12,056	9,411	9,322	9,306	9,657
2021 ANNUAL REVIEW	9,337	9,354	9,348	9,390	9,371	9,358	9,382	10,654	12,341	9,435	9,353	9,356	9,723
CHANGE (KJ/KWH)	33	45	61	44	44	15	25	138	285	24	31	50	66

Observations and Comments

- As indicated, the Heat Rate estimated for each month in JPS’s revised 2021-2022 forecast (2021 Annual Review) has increased relative to those in its 2019-2024 Rate Review Application.
- The 12-month average Heat Rate for the revised forecast is 9,723 kJ/kWh, which reflects an average increase of 66 kJ/kWh compared to the 12-month average for the forecast in the 2019-2024 Rate Review Application. However, the basis of the increases reflected in JPS’s revised 2021-2022 Heat Rate projections, was not substantiated.
- As was pointed out in the 2019-2024 Determination Notice, the Heat Rate values for 2022 February & March (highlighted in yellow in Table 7.6 above) in JPS’s revised 2021-2022 Heat Rate forecast, are questionable and signals that the generation dispatch forecast for these months may be sub-optimal.

7.23.4. According to JPS, when the approved 2021-2022 target of 9,667 kJ/kWh (2019-2024 Determination Notice) is applied to its revised 2021-2022 Heat Rate forecast, its heat rate performance would be 56kJ/kWh worse than the target and this would cause the company to under recover on its fuel bill for the period. On that basis, JPS proposed that the OUR revise the pre-established 2021-2022 target of 9,667 kJ/kWh.

7.24 JPS’s Proposed Heat Rate Target for 2021-2022 (Revised)

7.24.1. According to the 2021-2022 Annual Review Application, JPS opined strongly that in setting a reasonable and achievable Heat Rate target for the 2021-2022 review period the following must be taken into consideration:

- 1) The effects of the ongoing COVID-19 pandemic on the load demand;
- 2) The 40-day planned outage of JPS’s most efficient unit (Bogue ST14);
- 3) The Rockfort units’ Heat Rate deterioration; and
- 4) A reasonable buffer to alleviate the impact that higher than planned forced outages on the IPP units have on JPS’s fuel cost recovery, due to the running of less efficient units (peaking units) to maintain system reliability and mitigate load shedding.

7.24.2. As such, JPS submitted that in keeping with the principle of FCAM, it is proposing that the approved 2021 July – 2022 June Heat Rate target of 9,667kJ/kWh in the 2019-2024 Determination Notice be revised to 9,927kJ/kWh, as presented in Table 7.7 below.

Table 7.7 - JPS’s Proposed Heat Rate Target for 2021-2022 (Revised)

JPS PROPOSED HEAT RATE TARGET FOR 2021-2022 (REVISED)					
HEAT RATE METHODOLOGY	Tariff Period	JPS Proposed Target (2021-2022) – [KJ/KWH]		Difference (kJ/kWh)	Remarks
		2019-2024 Rate Review	2021 Annual Review		
JPS Thermal Plants	2021 July - 2022 June	9,860	9,927	67	

7.24.3. According to JPS, the proposed target will provide a buffer for unplanned events not already in the forecast, as well as a reasonable incentive for JPS’s efforts to improve its operational efficiency and minimize generation cost through optimal “merit order” practices and economic generation dispatch as per the guiding principles of the FCAM.

7.25 OUR’s Review of JPS’s 2021-2022 Heat Rate Proposals

Scope of Heat Rate Review

7.25.1. To support its determinations on JPS’s revised 2021-2022 Heat Rate forecast and target proposed in the 2021 Annual Review Application, the OUR pursuant to the legal and regulatory framework, carried out a comprehensive technical evaluation of the proposals, encompassing, among other things, the following activities:

- Technical evaluation of JPS’s 2021-2022 Heat Rate proposals (including all supporting schedules and data submitted by JPS up to 2021 June 11), using the OUR’s power system analysis/dispatch models;
- Develop Heat Rate forecast for 2021-2022 using OUR’s Heat Rate model;
- Scenario analysis to assess the effects of potential variations in JPS’s thermal generating plants’ performance, and the impact of credible system operating constraints during the subject rate adjustment period;
- Review of the pre-established 2021-2022 Heat Rate target (2019-2024 Determination Notice) and if necessary, adjust the target; and
- Review of the approved Heat Rate methodology, H-Factor and FCAM.

7.26 OUR’s 2021-2022 Heat Rate Evaluation

7.26.1. To appropriately assess JPS’s revised 2021-2022 Heat Rate proposals, (including all supporting schedules, data and assumptions submitted by JPS up to 2021 June 11), the OUR conducted its own Heat Rate evaluation using its power system analysis/dispatch models and Heat Rate Model. The model took into consideration all the relevant Heat Rate inputs/assumptions utilized during the 2019-2024 Rate Review Process, with all available updated data/parameters incorporated.

Inputs/Assumptions for Heat Rate Evaluation

7.26.2. The specific inputs/assumptions utilized in the OUR’s 2021-2022 Heat Rate evaluation are described in detail in the Final Criteria (ANNEX 4) and the 2019-2024 Determination Notice (Chapter 14). Details on some of the critical inputs/assumptions are provided below.

System Load Data (2021-2022)

7.26.3. In the 2021 Annual Review Application, JPS posited that the prevailing COVID-19 pandemic has suppressed its system load demand, and based on such impact, it has revised its system net generation (GWh) and peak demand (MW) downward relative to the projections in the 2019-2024 Rate Review Application. These system load assumptions in conjunction with elements of the OUR’s revised 2021 demand forecast, were used in the OUR’s Heat Rate evaluation. The revised system load data included in the 2021 Annual Review Application is presented in Table 7.8 below.

Table 7.8 - JPS’s System Net Generation and Peak Demand Forecast (2021-2022)

JPS SYSTEM NET GENERATION AND PEAK DEMAND FORECAST (2021 JULY – 2022 JUNE)					
Submission	Review Period	Net Gen (GWh)	Peak Demand (MW)	Load Factor (%)	Remarks
2019-2024 Rate Review	2021-2022	4,394.2	646.0	77.65	JPS Projection
2021 Annual Review	2021-2022	4,337.2	638.9	77.50	JPS Projection

7.26.4. According to JPS, the system net generation and peak demand for 2021-2022 were adjusted downward to account for the effects of the prevailing COVID-19 pandemic on system operations.

Committed Generation Projects to be Commissioned during 2021-2022

7.26.5. In the 2021 Annual Review Application, JPS indicated that the JPS/Caribbean Broilers 10MW Distributed Generation project (JPS/CB10MW CHP DG project) is projected to be commissioned and start commercial operations in 2021. The indication from the supporting Heat Rate information is that the facility will be added to the system in 2021 August. Accordingly, the plant was modelled and incorporated in the OUR’s 2021-2022 system analysis and Heat Rate evaluation.

Heat Rate Test Data

7.26.6. To support the Heat Rate proposals, JPS also submitted its 2020-2021 Heat Rate Test data, which was integral to the OUR’s Heat Rate evaluation. It is important to note that Heat

Rate Tests are critical for validating the current efficiency level of a generating unit relative to established limits, and are necessary for recalibration of the Heat Rate models. The 2020-2021 Heat Rate Test data for JPS's thermal plants is presented in Table 7.9.

Variable O&M Cost

7.26.7. In accordance with the Final Criteria, JPS provided the VOM costs for the generating units owned and operated by the company, which were reportedly computed from actual O&M expenditures. For the IPPs, the VOM costs were computed according to their respective PPAs. These VOM cost assumptions are provided in Table 7.9 below, and were used in the OUR's Heat Rate evaluation.

Table 7.9 - Generating Units Technical and Cost Data

GENERATING UNITS TECHNICAL AND COST DATA									
Owner	Unit	Fuel Type	MCR (MW)	HEAT RATE TEST DATA				VOM (US\$/MWh)	Remarks
				Min Capacity (MW)	Net Capacity (MW)	Max Capacity (MW)	Net Capacity (MW)		
JPS	RF1	HFO	20.00	10.40	19.30	9,472	8,928	1.848	
	RF2	HFO	20.00	10.10	19.80	9,388	8,918	1.848	
	GT5	ADO	21.50	10.33	22.20	18,465	14,768	0.448	
	GT10	ADO	32.50	10.59	31.62	21,483	13,710	0.179	
	GT3	ADO	21.50	10.40	20.36	20,652	15,960	0.448	
	GT6	ADO	18.00	5.83	14.66	22,303	16,448	0.382	
	GT7	ADO	18.00	5.16	15.67	24,404	16,286	0.382	
	GT9	ADO	20.00	5.32	20.76	27,364	14,415	0.382	
	GT11	NG	20.00	4.99	19.94	18,254	11,568	0.382	
	BOCCGT	NG	120.00	85.68	114.49	9,463	9,029	1.125	
IPPs	JPPC	HFO	60.00					12.92	
	JEP	HFO	124.36					23.060	
	WKPP	HFO	65.50					15.010	
	SJPC	NG/ADO	194.00					0.30	
	NFE	NG/ADO	94.00					0.10	
	Jamalco	HFO	2.00					-	

Fuel Price Forecast

7.26.8. The fuel prices used in the OUR's 2021-2022 Heat Rate evaluation are provided in Table 7.10 below.

Table 7.10 - Fuel Price Forecast used in 2021-2022 Heat Rate Evaluation

JPS FUEL PRICE FORECAST (2020-2024)									
PLANT	FUEL	2019-2024 RATE REVIEW APPLICATION				2021 ANNUAL REVIEW FILING			
		2021		2022		2021		2022	
		US\$/BBL	US\$/MMBTU	US\$/BBL	US\$/MMBTU	US\$/BBL	US\$/MMBTU	US\$/BBL	US\$/MMBTU
JPS OH	HFO	59.46	9.88	62.94	9.59	-	-	-	-
JPS HB	HFO	60.08	9.97	63.56	9.69	-	-	-	-
JPS RF	HFO	60.79	10.08	64.27	9.80	64.41	9.71	57.23	8.63
JPS HB	ADO	80.12	14.25	85.20	13.79	83.88	13.65	74.58	12.13
JPS BO	ADO	86.23	15.25	91.31	14.82	90.34	14.70	80.26	13.06
JPS BO	NG	-	9.67	-	9.97	-	10.91	-	10.89
IPPs (JPPC, JEP, WKPP)	HFO	59.81	10.09	60.25	9.96	66.89	10.08	59.45	8.96
SJPC CCGT	NG	-	7.97	-	7.97	-	8.53	-	8.54
NFE (CHP)	NG	-	7.97	-	7.97	-	8.53	-	8.54

- 7.26.9. Although JPS indicated no specific price references, it was verified that the NG price projections were developed based on Henry Hub (HH) NG Futures forecast in conjunction with the respective NFE/JPS GSAs. For HFO and ADO, the price forecasts were referenced to US Gulf Coast (Platts) futures settlement and the respective JPS/Petrojam fuel supply agreements (FSAs).
- 7.26.10. Additionally, the 2021-2022 price projections for fuel oil included in the 2021 Annual Review Application appears to be relatively lower than those presented by JPS in the 2019-2024 Rate Review Application. This has implications for the scheduling and dispatch of the generating plants.

Verification Check – JPS’s Heat Rate Data

- 7.26.11. To ensure that its system analysis models and Heat Rate model are properly calibrated, the OUR simulated the generation system operating performance (including generation dispatch) for the period 2020 May – 2021 April, using actual system data reported by JPS for the stated period. The results of this validation test indicate that the OUR’s system analysis models and Heat Rate model are highly representative, as there was close convergence with the simulated outputs and the actual system performance outcomes. After establishing that the referenced models are representative and reliable, the OUR proceeded with its Heat Rate evaluation, the results of which were used to generate the OUR’s revised 2021-2022 Heat Rate forecast.

OUR’s Heat Rate Evaluation Results

- 7.26.12. The OUR’s Heat Rate evaluation generated different categories of results, including annual Heat Rate projections for JPS’s thermal plants, system Heat Rates, plant dispatch levels and net generation, for the 2021-2022 review period. The results are summarized below.

OUR’s Generation Dispatch Projections

- 7.26.13. The results of the generation system assessment indicate the level of utilization (CF) of each available generating unit scheduled for operation during the 2021-2022 review period. These plant dispatch levels were estimated based on economic/optimal generation dispatch, subject to credible system constraints, which were taken into account. Based on the operating characteristics of JPS’s thermal generating units, their dispatch levels

largely influence their average Heat Rate performance in a given billing period. Following that logic, the generating plants’ dispatch levels are also integral for calculating the monthly average Heat Rates (projected and actual) required for the H-Factor. The OUR’s estimated 2021-2022 NEO/CF for the generating units in the system were largely consistent with the projections outlined in the 2019-2024 Determination Notice. These parameters were used to derive the OUR’s 2021-2022 average Heat Rate for JPS.

OUR’s Projected Average Heat Rate for JPS (2021-2022)

7.26.14. With the available Heat Rate data and the forecasts of the generation system performance parameters presented above, the OUR estimated the 12-month average Heat Rate for JPS’s thermal generating plants for the 2021 July - 2022 June review period using its Heat Rate Model. The OUR’s estimated 2021-2022 average Heat Rate for JPS is presented in Table 7.11 below. For comparison, JPS’s revised average Heat Rate for 2021-2022 is also included.

Table 7.11 - Comparison of JPS’s and OUR’s Heat Rate Projections (2021-2022)

2021-2022 HEAT RATE PROJECTIONS: JPS versus OUR							
RATE ADJUSTMENT PERIOD	HEAT RATE MODALITY	JPS HEAT RATE FORECAST (KJ/KWH)			OUR HEAT RATE FORECAST (KJ/KWH)		
		2019-2024 Rate Review	2021 Annual Review	Variance	2019-2024 Rate Review	2021 Annual Review	Variance
2021-2022	JPS Thermal Plants	9,657	9,723	66	9,327	9,304	-23

Indications from OUR’s 2021-2022 Heat Rate Evaluation

7.26.15. The results indicate that the OUR’s forecast 2021-2022 average Heat Rate for JPS (9,304 kJ/kWh) is slightly lower than the corresponding value it presented in the 2019-2024 Determination Notice (9,327 kJ/kWh). This appears to be largely due to the following factors:

- The availability of actual performance data for large-scale generating facilities added to the system in 2019 and 2020, allowing for improved calibration of the OUR’s system analysis models and “Heat Rate Model”, thus providing a more accurate representation of the generation system operation and Heat Rate performance.
- The projected reduction in system peak demand and net generation for 2021, resulting in reduced utilization of some of JPS’s marginal generating units (low efficiency/high variable cost units), thus decreasing their contribution to the company’s overall thermal plants Heat Rate performance.

7.26.16. The projected average Heat Rate performance to be achieved by JPS during the 2021-2022 rate adjustment period is expected to be dominated by the operation of its Bogue CCGT, RF#1 and RF#2 units, with relatively high utilization levels. Conversely, JPS’s open cycle gas turbine (OCGT) units (peak load units) are expected to operate at very low average capacity factors (CF < 3%), with minuscule contribution to its average Heat

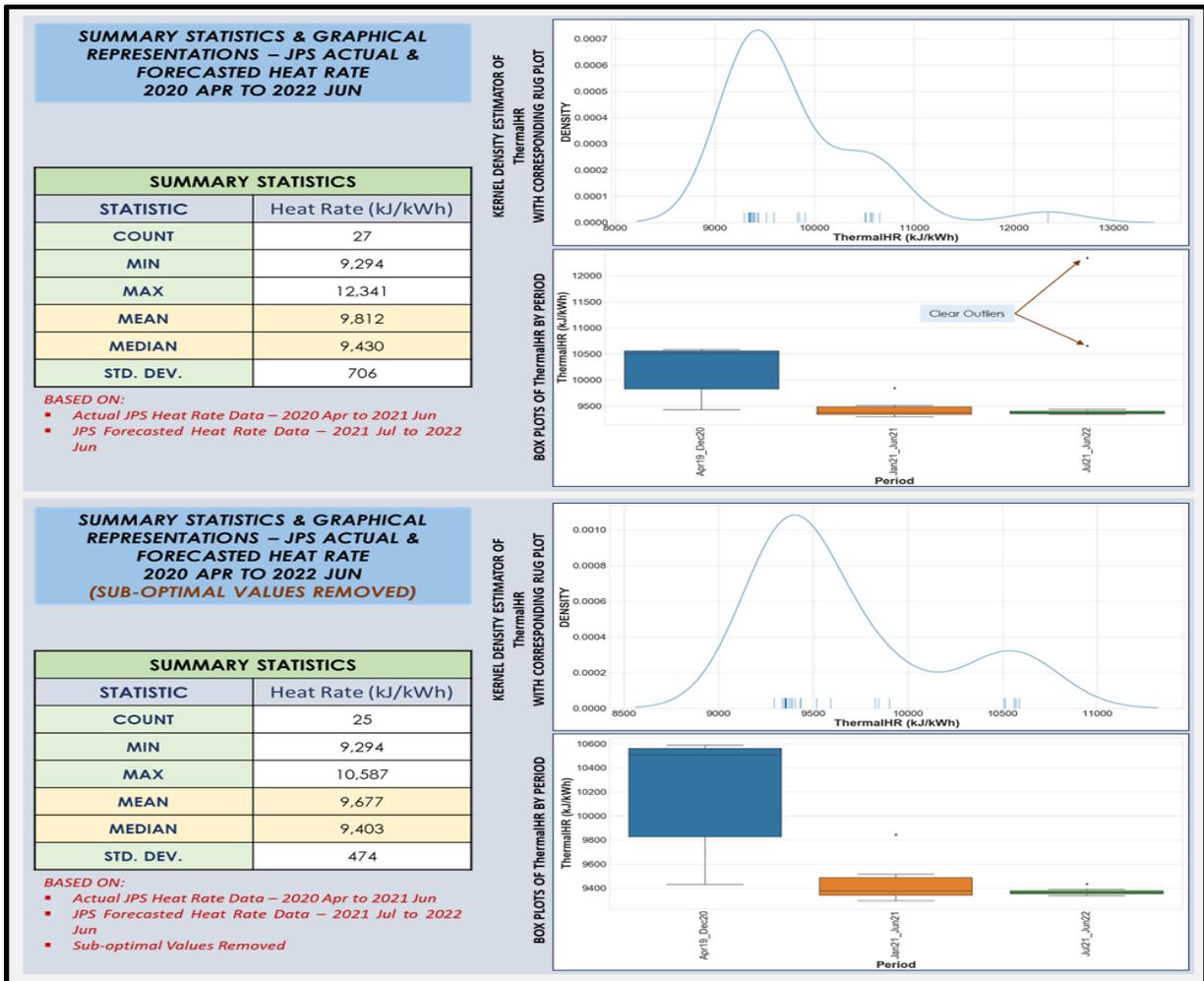
Rate performance over the period, and therefore, should not impose any adverse effects that would derail the achievement of the established target.

- 7.26.17. The existing generation system configuration/capacity and forecasted system demand (MW) for the 2021-2022 review period indicate that the system reserve capacity/margin (MW) in each month of the period will be above the threshold prescribed by the Electricity Sector Codes. This means that the respective capacity margins would be sufficient to address short-term generation/load imbalances and potential contingency conditions resulting from a major forced outage of a large-scale generation facility, and to ensure system security.
- 7.26.18. JPS's forecast average Heat Rates for 2022 February & March presented in the 2021 Annual Review Application (10,654 kJ/kWh and 12,341 kJ/kWh) were found to be not reflective of "optimal generation dispatch" as required by the established Heat Rate principles. The OUR also highlighted similar findings in the 2019-2024 Determination Notice for the corresponding Heat Rate values (2022 February & March - 10,516 kJ/kWh and 12,056 kJ/kWh respectively) presented by JPS in the 2021-2024 Rate Review Application. In both cases, the OUR's system analysis models indicate that the 2022 March value is excessively high and does not reflect economic generation dispatch operation.
- 7.26.19. Further, the OUR's Heat Rate evaluation found that the steam unit (ST14) component of the Bogue CCGT plant, is scheduled for major maintenance for the period 2022 February 18 to 2022 May 1, which would have some impact on JPS's average Heat Rate performance for the 2021-2022 review period. However, JPS's 2022 net generation and capacity factor projections show that during the 41-day outage of ST14, the two (2) associated GT units (GT#12 & 13), which have relatively high design Heat Rates (low efficiency) and relatively high variable costs, were scheduled to be dispatched at very high capacity factors, while available IPP generation facilities with much lower variable costs and are placed higher in the "merit order" were not appropriately dispatched to achieve optimal dispatch of the generation system, subject to credible system constraints. These apparent sub-optimal dispatch operations are not in alignment with the legal & regulatory framework governing the generation dispatch process, and does not assure confidence that JPS's Heat Rate forecasts and proposed targets are reasonable and representative.

Statistical Analysis

- 7.26.20. To test the reasonableness of JPS's proposed 2021-2022 Heat Rate target (9,927 kJ/kWh), the OUR used the Heat Rate data (historical and projected) to perform statistical analyses, which generated the summary statistics, presented in Figure 7.8 below.

Figure 7.8 - Summary Statistics - JPS's Heat Rates (2020 Jan to 2022 Jun)



Key Observations and Deduction

- 7.26.21. The results for each defined scenario indicate that the centre of the Heat Rate distribution (the median) is at 9,403 kJ/KWh, which is expected because the median is a robust statistic and not susceptible to the effects of extreme observations.
- 7.26.22. The statistics generated for the scenario with the sub-optimal Heat Rate values (2022 February & March) excluded from the dataset, show that the mean Heat Rate value converges towards the median value. This result also indicates that the mean value (9,677 kJ/kWh) is approximately equal to the re-established target for 2021-2022 of 9,667 kJ/kWh (2019-2024 Determination Notice).
- 7.26.23. The summary statistics infer that a Heat Rate target that is within the vicinity of the median and mean value (9,403 – 9,812 kJ/kWh), would be statistically representative. JPS's proposed Heat Rate target for 2021-2022 (9,927 kJ/kWh), is outside this range.

Scenario Analysis

7.26.24. To validate the robustness of the approved 2021-2022 Heat Rate target for JPS in the 2019-2024 Determination Notice, the OUR performed sensitivity/scenario analysis around the target using its revised forecast of JPS’s 2021-2022 Heat Rates, JPS’s 2021-2022 Heat Rate forecast (2021 Annual Review), the indicated statistical results, and other relevant parameters. This process involved the evaluation of a series of “operating scenarios”, to ascertain whether the pre-established 2021-2022 target is still representative and reasonable for H-Factor adjustment during the subject review period. The results of this sensitivity analysis indicate that the pre-established 2021-2022 Heat Rate target for JPS of 9,667 kJ/kWh, is sufficiently robust, representative and reasonable for application during the 2021-2022 review period. This means that contrary to JPS’s proposal, no adjustment to this target is warranted.

7.27 OUR’s Heat Rate Target (2021-2022)

7.27.1. Based on the results of OUR’s Heat Rate evaluation/analysis, it was determined that the approved 2021-2022 Heat Rate target for JPS in the 2019-2024 Determination Notice (9,667 kJ/kWh), will be maintained. Accordingly, this target shall be applied to the H-Factor for efficiency adjustment in the approved FCAM for each billing month during the 2021-2022 review period, as indicated in Table 7.12 below.

Table 7.12 – OUR’s Approved Heat Rate Target for JPS (2021-2022 Rate Adjustment Period)

APPROVED HEAT RATE TARGET FOR JPS (2021-2022 REVIEW PERIOD)						
RATE ADJUSTMENT PERIOD	HEAT RATE MODALITY	JPS PROPOSED TARGET (2021-2022) – [KJ/KWH]		OUR APPROVED TARGET (2021-2022) – [KJ/KWH]		2021 Annual Review Target Variance
		2019-2024 Rate Review	2021 Annual Review	2019-2024 DET NOTICE	2021 ANNUAL REVIEW	
2021-2022	JPS Thermal Plants	9,860	9,927	9,667	9,667	260

7.27.2. In the 2021 Annual Review, JPS argued that the approved 2021-2022 Heat Rate target of 9,667 kJ/kWh (2019-2024 Determination Notice) should be reset to reflect the impact of the current COVID-19 pandemic on the load demand and JPS’s thermal fleet’s ability to perform efficiently while integrating renewable energy generation. Paradoxically, while JPS is advocating for a re-evaluation of the 2021-2022 generation system operation and forecast Heat Rate performance to account for conditions it claims are impacting system load and generation dispatch, its own generation dispatch forecast for 2021-2022 was found to be not in accordance with merit order/economic generation dispatch as stipulated by the Electricity Act, 2015, the Licence 2016, and the Electricity Sector Codes. Moreover, the OUR’s evaluation found that some of the 2021-2022 monthly Heat Rate forecast by JPS are excessive and not consistent with the optimal mix of generation assets assumed to be available for operation during the 2021-2022 review period.

7.27.3. On the matter of the load demand assumptions, the OUR’s 2021-2022 Heat Rate evaluation took account of the impact of COVID-19 on system demand (MW) and net generation (GWh) during the 2019-2024 Rate Review Process, which has been revised during this 2021 Annual Review proceeding.

Target Achievement and Enabling Factors

7.27.4. Despite JPS's arguments challenging the pre-established 2021-2022 Heat Rate target (9,667 kJ/kWh), based on known system conditions, generation plants operating capabilities, and the 2021-2022 Heat Rate assumptions and performance forecast, overall, it is expected that on average, the company will achieve the approved Heat Rate target during the subject rate adjustment period. Specifically, some of the enabling factors that should contribute to target achievement, include, among other things:

- 1) The recent major overhaul of the RF#1 (2021 March 27 – May 1), and the resulting improvement in overall plant operational efficiency;
- 2) Recent efficiency improvements on other existing JPS generating units;
- 3) Major maintenance of other major JPS generating units during the 2021-2022 review period, with expected efficiency improvements that should be sustained during the period;
- 4) Expected benefits from other ongoing and planned efficiency improvement programmes;
- 5) Effective management of the generation dispatch process and system operating constraints;
- 6) The impact of the 24.5MW HESS on system operations, particularly, to mitigate intermittency effects caused by VRE generation, which could impose potential adverse effects on JPS's Heat Rate performance;
- 7) The predominance of IPP-based capacity (NG and HFO) in the system, which should economically displace some low-efficiency/high variable cost generating units in the generation dispatch process;
- 8) The expected addition of the committed JPS/CB 10MW CHP DG facility to the system in 2021, which is expected to improve generation efficiency by limiting the utilization of inefficient/high marginal cost GT units during peak and some partial peak periods;
- 9) The upgrading/reinforcement of the T&D network consistent with JPS's 5-year (2019-2023) Business/Investment Plan, to facilitate optimal power flows in the transmission system and mitigate system constraints that would adversely impact the generation dispatch operations; and
- 10) The incorporation of exceptional IPPs' forced outages in the OUR's Heat Rate Models used for establishing the relevant Heat Rate targets.

JPS's Heat Rate Projections versus OUR's Targets

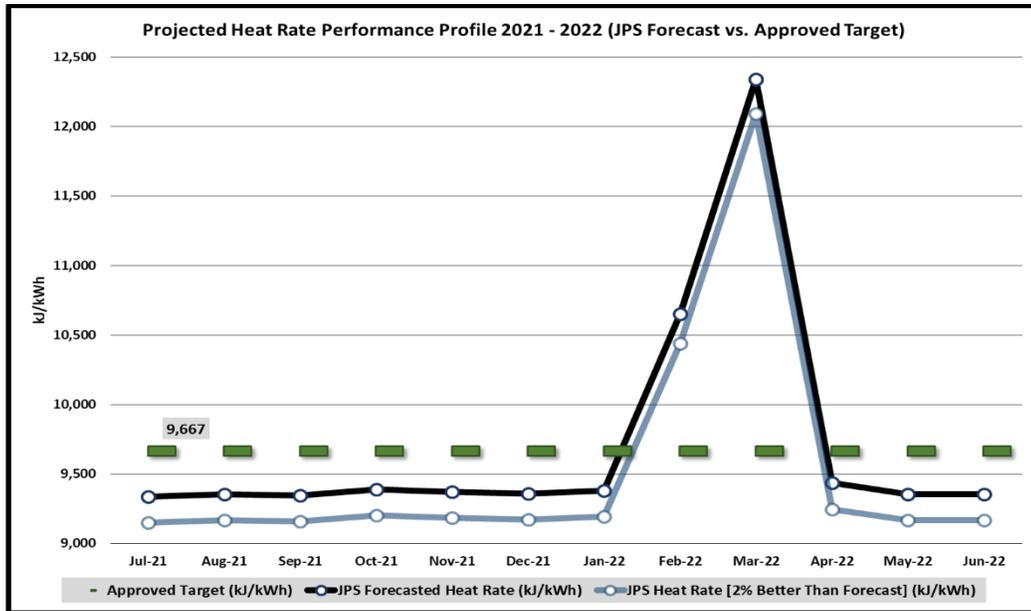
7.27.5. A fundamental feature inherent in the H-Factor dynamics is that the Heat Rate target represents an annual average threshold that is applied on a monthly basis. This means that JPS's Heat Rate performance in each billing month, relative to the applicable target, is not inherently discrete, but operates within a continuum subject to the time-limits of the respective rate adjustment periods. That is, an under achievement of the target in one or two billing months, may not necessarily lead to penalties to the company on aggregate, at the end of the rate adjustment period. This construct is demonstrated in Table 7.13, based on a comparison of JPS's 2021-2022 monthly Heat Rate projections against the OUR's target.

Table 7.13 - Comparison of JPS's 2021-2022 Monthly Heat Rate Projections against Approved Target

JPS' 2021-2022 HEAT RATE PROJECTIONS VERSUS OFFICE APPROVED TARGET							
REVIEW PERIOD [2021-2022]	JPS HEAT RATE FORECAST (2021-2022) – [KJ/KWH]		OUR TARGET (2021-2022) [KJ/KWH]	APPROVED – [KJ/KWH]	2021-2022 VARIANCE (TARGET – FORECAST)- [KJ/KWH]		REMARKS
	2019-2024 Rate Review	2021 Annual Review	2019-2024 Rate Review & 2021 Annual Review	2019-2024 Rate Review	2021 Annual Review		
2021 JUL	9,304	9,337	9,667		363	330	
2021 AUG	9,309	9,354	9,667		358	313	
2021 SEP	9,287	9,348	9,667		380	319	
2021 OCT	9,346	9,390	9,667		321	277	
2021 NOV	9,327	9,371	9,667		340	296	
2021 DEC	9,343	9,358	9,667		324	309	
2022 JAN	9,357	9,382	9,667		310	285	
2022 FEB	10,516	10,654	9,667		-849	-987	Suboptimal
2022 MAR	12,056	12,341	9,667		-2,389	-2,674	Suboptimal
2022 APR	9,411	9,435	9,667		256	232	
2022 MAY	9,322	9,353	9,667		345	314	
2022 JUN	9,306	9,356	9,667		361	311	
AVERAGE	9,657	9,723	9,667		10	-56	

For emphasis, the projected Heat Rate performance profile is further illustrated in Figure 7.9.

Figure 7.9 - Projected Heat Rate Profile for 2021-2022 (JPS's Forecast versus Approved Target)



7.27.6. As indicated in Table 7.13 and Figure 7.9, despite the high Heat Rate values projected for 2022 February and March (sub-optimal dispatch), on average, JPS would achieve the 2021-2022 Heat rate target over the 12-month period. Further, the H-Factor construct described above, dictates that JPS must be consigned to economic/optimal generation

dispatch operations during the period in order to meet the established target, and to recover the associated total fuel cost without penalties.

- 7.27.7. Given all these considerations, the Office maintains that the approved 2021-2022 Heat Rate target of 9,667 kJ/kWh is deemed reasonable and achievable, and consistent with the legal and regulatory framework.

7.28 2021-2022 H-Factor Methodology and FCAM

- 7.28.1. As outlined in the 2019-2024 Determination Notice, the approved 2021-2022 Heat Rate target (subject to revision at each Annual Review) in conjunction with JPS’s thermal Heat Rate performance (actual at the time of adjustment) during the said period shall constitute the H-Factor. According to the Licence 2016, this H-Factor adjustment shall be applicable to the approved FCAM for the calculation of the appropriate Fuel Rate for each “billing month” during the 2021-2022 rate adjustment period.

Fuel Cost Adjustment Mechanism (FCAM) – 2021-2022

- 7.28.2. As stipulated by the requirements of Schedule 3 (Exhibit 2) of Licence 2016 the monthly fuel cost of JPS’s thermal generating plants to be passed on to ratepayers shall be subject to efficiency adjustment by only the H-Factor (based on the Heat Rate methodology approved by the Office) in the FCAM, commencing 2016 July 1. Accordingly, the OUR has since determined that the applicable FCAM to be utilized by JPS for the monthly Fuel Rate adjustment shall be the option defined as “*Alternative 1*” of Exhibit 2 in Schedule 3 of the Licence 2016.
- 7.28.3. Therefore, in keeping with the requirements of the Licence 2016, the Office has determined that JPS shall continue to apply the FCAM approved in the 2019-2024 Determination Notice during the 2021-2022 review period. The approved FCAM is defined by the formulae below.

$$\text{Allowed Fuel Cost} = \text{IPPs Fuel Cost} + \left[\text{JPS Fuel Cost} \times \text{H-Factor [Thermal]} \right]$$

[OUR Approved FCAM: (2020 - 2024)]

Where: *The H-Factor = [JPS’s Heat Rate Target (thermal)]/JPS Heat Rate Actual (thermal)*

7.29 OUR’s Heat Rate Review – Issues and Positions

- 7.29.1. While there have been recognizable improvements in the overall efficiency of the generation system over time, a number of issues have emerged during the 2019-2024 Rate Review process, some of which have lingered and have amplified the OUR’s concerns at this 2021 Annual Review. It should be noted that these issues have serious ramifications for the operation of the system going forward, including cost implications. The specific issues are delineated in the sections below.

Generation Dispatch Issues

7.29.2. On the matter of generation dispatch, the OUR's system analyses continue to detect problematic issues that question the acceptability of JPS's generation dispatch process, as well as outputs, and projections that appear to deviate from the requirements of the legal and regulatory framework governing economic generation dispatch in the power system. In light of these concerns, the Office believes that it is imperative that the required "generation dispatch audit" as stated in the 2019-2024 Rate Review Determination Notice, should be completed within the 2021-2022 review period.

VOM Costs in Merit Order/Generation Dispatch Calculations

7.29.3. Based on the Heat Rate data provided by JPS, it would appear that the VOM costs for JPS-owned generating units have been included in the total variable cost of those units for the generation dispatch operations. However, the veracity of this cost data could not be immediately verified. This will require further review.

Heat Rate Target Setting

7.29.4. Based on the requirements of the Licence 2016, regulatory precedence, and for the reasons cited herein, the Office maintains its decision that the Heat Rate targets and H-Factor shall be based on JPS's thermal generating plants.

7.29.5. The Office also maintains that the determined Heat Rate target is reasonable and achievable, and would encourage optimal generation dispatch operations during the subject review period.

7.29.6. Additionally, the Office in setting the Heat Rate target, considers the following key conditions:

- a) The configuration of the generation system (existing and projected) and its capability to achieve the target;
- b) IPPs forced outage rates (FORs) and the impact of major forced outages; and
- c) The requirements of the legal & regulatory framework, established Heat Rate target principles, and good regulatory practice.

Review of Heat Rate Targets

7.29.7. On the matter of target adjustment, the concerns expressed by JPS in the 2021 Annual Review Application, are viewed as not unreasonable. However, these factors were taken into account in the OUR's Heat Rate evaluation and determination of the 2021-2022 Heat Rate target, during the 2019-2024 Rate Review process. They have again been taken into consideration in the OUR's Heat Rate evaluation and review of the target during this 2021 Annual Review proceeding. As established in the 2019-2024 Rate Review Determination Notice and based on regulatory precedence, going forward, the OUR will continue to review the Heat Rate targets at each Annual Review, and reset if necessary.

7.30 Office Determination: 2021-2022 Heat Rate Target, H-Factor and FCAM

7.30.1. In making its determination on the Heat Rate target, H-Factor and FCAM for the 2021-2022 rate adjustment period, the Office took into consideration, among other things, the following:

- The results of the OUR's 2021-2022 Heat Rate evaluation;
- The relevant provisions of the Licence 2016; and
- The Heat Rate and "fuel cost recovery" determinations set out in the 2019-2024 Determination Notice.

7.30.2. On that basis, the Office's determinations on JPS's H-Factor proposals and the FCAM are set out in Determination 13 below.

Determination 13

The Office has determined that:

- 1) JPS's proposed Heat Rate target (revised - 9,927 kJ/kWh) for the 2021-2022 rate adjustment period is deemed to be unrepresentative and inconsistent with the promotion of optimal economic generation dispatch. It is therefore not allowed.
- 2) The pre-established 2021-2022 Heat Rate target in the 2019-2024 Determination Notice of 9,667 kJ/kWh, shall be applicable for the 2021-2022 rate adjustment period.
- 3) The Heat Rate methodology based on JPS's thermal generating plants shall continue to be applied for the H-Factor and FCAM during the 2019-2024 Rate Review period.
- 4) The H-Factor adjustment shall be based on JPS's fuel cost for the preceding calendar month. This shall be implemented immediately after the effective date of this Annual Review Determination Notice.
- 5) JPS shall comply with all the Fuel and H-Factor related requirements, including the regulatory reporting requirements specified in this Determination Notice.

8 2020 System Losses Performance and Y-Factor Adjustment

8.1 Background

8.1.1. Based on the provisions of Schedule 3 of the Licence 2016 (Schedule 3) applicable to the Annual Revenue Target (ART) adjustment mechanism incorporated in the defined price control regime, at each Annual Review during a revenue cap period, the OUR is required to measure JPS's annual System Losses performance against the relevant targets set in the 5-year Rate Review Determination, in order to calculate the applicable "Y-Factor". As outlined in the Licence 2016, the Y-Factor is required for computing the "true-up losses" (TULos) component of the Revenue Surcharge (RS), necessary for determining the "ART" for the applicable year.

Scope of OUR's 2020 System Losses Review

8.1.2. The OUR's System Losses review at this 2021-2022 Annual Review, encompasses among other things, the following activities:

- Assessment of JPS's 2021 Annual Review System Losses proposals and the 2020 System Losses performance measurements;
- Evaluation of JPS's 2020 System Loss reduction initiatives, including associated capital expenditure and impacts; and
- Calculation of the 2020 Y-Factor required for the derivation of the "TULos2020" component of the 2020 Revenue Surcharge.

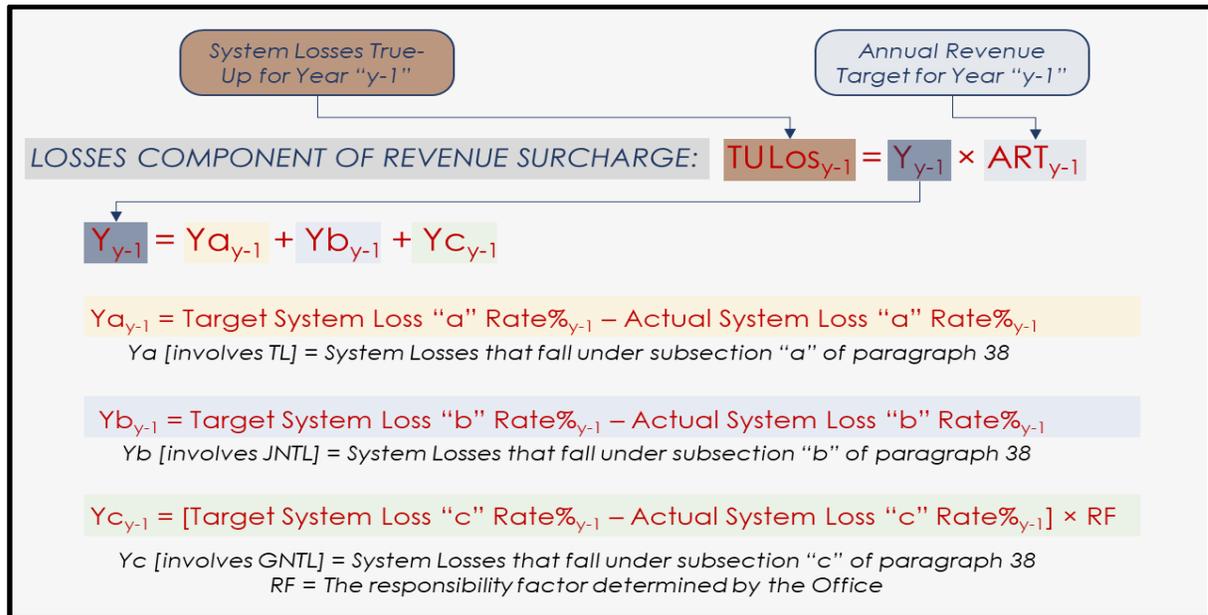
Licence Requirements Applicable to System Losses

8.1.3. For reference, the regulatory requirements applicable to System Losses are defined under Schedule 3, Paragraphs 37, 38, and 46; and Exhibit 1 of the Licence 2016.

Y-Factor and True-Up Losses Adjustment Mechanism

8.1.4. As prescribed by the Licence 2016 (Schedule 3, Exhibit 1), the "Y-Factor" and the related "TULos" component of the Revenue Surcharge (RS) required for the determination of the applicable "ART" adjustment, shall be calculated based on the defined mechanism, which is presented in Figure 8.1 below.

Figure 8.1 - Y-Factor and True-up Losses Adjustment Mechanism



Where:

- Ya involves Technical Losses (“TL”);
- Yb involves Non-Technical Losses (NTL) totally within JPS’s control (“designated JNTL”);
- Yc entails NTL not totally within JPS’s control (“designated GNTL”); and
- RF is the responsibility factor, a percentage from 0% to 100%, which is determined by the Office.

8.1.5. Implicit in the Y-Factor design is a symmetrical incentive scheme which operates in a manner that allows for financial benefits or penalties associated with any corresponding over-achievement or under-achievement of the determined System Losses targets, which will be applied in the defined PBRM.

Office Determined 2020 System Losses Targets

8.1.6. Pursuant to Schedule 3, Paragraph 38, of the Licence 2016, the targets set by the Office for System Losses shall normally be done at the Rate Review and be for a “rolling” ten (10)-year period broken out year by year for the (3) defined loss categories: TL, JNTL and GNTL.

8.1.7. During the 2019-2024 Rate Review process, the Office determined the relevant 2019-2023 System Losses targets required for the calculation of the “Y-Factor” at each Annual Review during the 2019-2024 revenue cap period. These targets were set out in Chapter 14 of the 2019 -2024 Determination Notice. The relevant 2020 targets to be applied at this 2021 Annual Review are presented in Table 8.1 below.

Table 8.1 – OUR’s Determined 2020 System Losses Targets

OUR DETERMINED 2020 SYSTEM LOSSES TARGETS									
Loss Data (Year)	Rate Adjustment Period	JPS’s Proposed 2020 Targets (COVID-19 Impact)				OUR’s Determined 2020 Targets (COVID-19 Impact)			
		TL	JNTL	GNTL	RF	TL	JNTL	GNTL	RF
2020	2021-2022	7.85%	7.54%	13.94%	10.0%	7.77%	4.71%	11.58%	20.0%

8.2 JPS’s 2020 System Losses Performance

Categorization of JPS’s System Losses

8.2.1. As stipulated in ANNEX 3 of the Final Criteria for the JPS 2019-2024 Rate Review Process, (“the Final Criteria”), JPS is required to structure and report the monthly System Losses in the defined Energy Loss Spectrum (ELS) framework to facilitate regulatory assessment of System Losses performance and target setting at Rate Reviews and Annual Reviews, and to support ongoing monitoring of system efficiency. This defined ELS framework provides a reasonable breakdown of JPS’s total System Losses into various sub-categories of TL and NTL, computed each month/year on a 12-month rolling average basis.

JPS’s ELS Issues

8.2.2. In the 2021 Annual Review Application, JPS asserted that in its 2019 Rate Review application it communicated serious concerns about the use of the ELS to set NTL targets and measure NTL performance. JPS argued that the use of the ELS was unusual given the technical challenges involved in creating an accurate report and the questionable benefits it would provide to the target-setting process. According to JPS, it proposed an alternative mechanism in its 2019 application, which uses the coverage of smart meters to characterize the level of control available to the company, and it continues to advocate for this or a similar approach which uses verifiable and mutually available variables to set targets.

8.3 OUR’s Position

8.3.1. The OUR’s response to JPS’s arguments regarding the use of the ELS is as follows:

- 1) Firstly, it is important to underscore that in order for JPS to effectively manage and mitigate System Losses, the company must be able to appropriately measure it, which is a fundamental responsibility of the company. Notwithstanding, over the past ten years, the OUR has collaborated with JPS in establishing a reasonable framework to guide the measurement and reporting of System Losses, which includes the ELS. As designed, the ELS provides a detailed breakdown of the total System Losses (TL and NTL) recorded for a given billing month (calculated on a 12-month rolling average basis) into various sub-categories/sources of energy losses. Although not 100% precise (due to TL and NTL approximation issues), the ELS data is deemed useful and reasonable for evaluating the relevant aspects of System Losses defined by the Licence 2016.

- 2) As stipulated in the Final Criteria, JPS is required to submit to the OUR, the relevant ELS which shall be structured in accordance with the requirements and conditions of ANNEX 3 of the said Final Criteria. The ELS submitted by JPS up to the 2020 reporting period have been found to be largely consistent with the defined framework, and the ELS reports have been previously viewed by the company as acceptable and reasonable. Therefore, JPS's recent assertion that the ELS is unsuitable for regulatory assessment of its System Losses, without substantiation, is not constructive.
- 3) The ELS is not a mechanism or principle of rate-making. It is simply a framework that provides important and necessary information on JPS's energy losses, which serves to reduce the "information asymmetry" in relation to the treatment of JPS's System Losses during Rate Reviews and Annual Review proceedings. Despite some existing constraints, it is considered a useful loss-reporting framework and not a detriment, as is being suggested by JPS. Suffice it to say that:
 - At no time has the OUR ever affirmed that the ELS provides a perfect quantification of the System Losses components. While the global losses can be measured accurately, a precise disaggregation is difficult given that certain categories of System Losses cannot be directly measured and have to be estimated, using reasonable approximation methodologies. Therefore, JPS's assertion that the use of the ELS was unusual given the technical challenges, is ill founded.
 - The quality/reliability of the ELS has improved progressively over time due to greater availability of System Losses related data, resulting from the increased deployment of advanced technologies, including advanced metering infrastructure (AMI) in the transmission and distribution (T&D) network, and strict regulatory requirements.
 - During the 2014-2019 Rate Review process, it was established that the ELS as at December of each year prior to a Rate Review or Annual Review would be the foundational basis for the assessment of JPS's System Losses performance and derivation of the relevant targets going forward. However, while the ELS will form the core of the required System Losses performance assessment, this condition does not preclude the consideration of other relevant factors. Furthermore, the application of this methodology is consistent with precedence. It is notable that after the implementation of the Licence 2016, this said approach continued to be applied, specifically, at JPS's 2016, 2017 and 2018 Annual Reviews and during the 2019-2024 Rate Review Process.
- 4) Despite JPS's repudiation of the ELS, ironically, the company has utilized it for System Losses forecast in the 2019-2024 Rate Review Application (2018-2023), and recently, for the derivation of the 2020 Y-Factor in its 2021 Annual Review Application, and other related proceedings initiated in 2021.
- 5) While JPS has sought to selectively criticize the suitability of the ELS for System Losses performance measurement, it has failed to put forward a superior reporting framework.

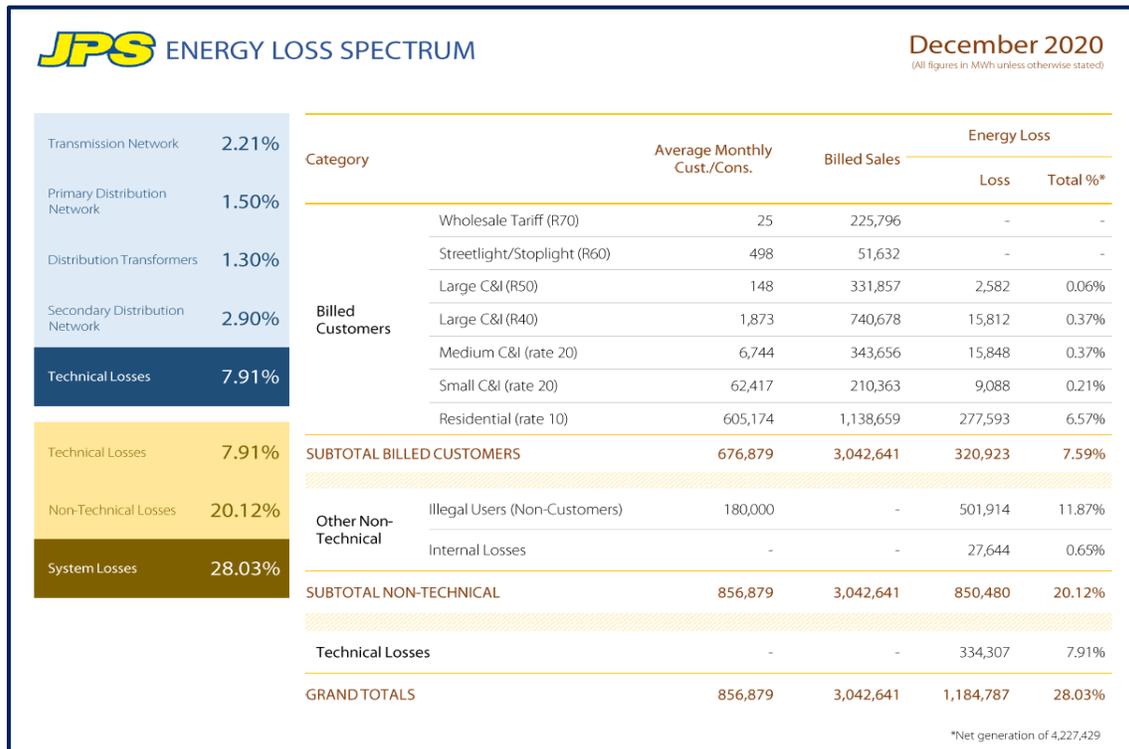
- 6) From the arguments presented, it would appear that JPS is conflating two issues; the ELS framework and the NTL distribution (JNTL and GNTL), which are two separate issues. As outlined above, the benefits and limitations of the ELS are acknowledged, but efforts to ensure improvements continue. With respect to the NTL distribution, JPS claims that the “alternative mechanism” it proposed in the 2019-2024 Rate Review Application (based on the use of smart meter coverage to characterize JPS’s level of control of NTL), provides verifiable and available variables to set targets.
- 7) However, as indicated in the 2019-2024 Determination Notice, the OUR conducted a thorough assessment of the proposed alternative NTL allocation mechanism, which found that the existing design is at a conceptual stage and does not meet the standard for practical application. The specific deficiencies of the proposed mechanism as detected by the OUR include:
 - It is abstract and lacked practicality with no sound connection to the relevant performance indicators/metrics.
 - It is viewed as a “work-in-progress” model, which is not properly calibrated to facilitate robust analysis.
 - The existing design is unproven/untested, which provides less than adequate confidence on the reliability and efficacy of the model, making it suitable for allocating NTL into JNTL and GNTL, which has significant cost implications.

8.3.2. Based on these factors, the Office rejected the proposed alternative NTL allocation mechanism.

8.4 2020 System Losses Data

8.4.1. The 2020 System Losses data recorded by JPS up to the end of the year, as structured in the 2020 December ELS, and required for the 2020 performance measurement and Y-Factor computations, is provided in Figure 8.2 below.

Figure 8.2 – 2020 System Losses Breakdown (2020 December ELS)



8.4.2. As shown in Figure 8.2, total System Losses at the end of 2020 December was 28.03% of net annual generation, with TL and NTL accounting for 7.91% and 20.12% respectively, which reflects an increase of 1.98% of annual net generation relative to the 2019 level of 26.05%, (see Table 8.2 below). According to JPS, this outcome was mainly due to the adverse effects of the COVID-19 pandemic encountered in 2020 and a resulting decrease in the annual net generation.

8.5 2020 Energy Balance

8.5.1. For the 2020 energy balance, the 2020 December ELS indicates that at year end, the recorded annual net generation was 4,227.4 GWh, with total billed electricity sales accounting for 3,042.6 GWh (71.97%), while 1,184.4 GWh (28.03%) were consumed by System Losses. Although, there was an uptick in System Losses in 2020, as indicated in Table 8.2 below, total net generation for the year decreased by 202.5 GWh or 4.6% compared to that reported for 2019 (4,429.9 GWh). This appears to be largely due to declining electricity sales triggered by COVID-19 conditions.

8.6 2020 Monthly System Losses Breakdown

8.6.1. The 2020 monthly System Losses breakdown included in the 2020 January – December ELS, submitted by JPS as part of the 2021 Annual Review supporting schedules, is presented in Table 8.2 below.

Table 8.2 – JPS’s 2020 Monthly System Losses Data as captured in the 2020 Jan – Dec ELS

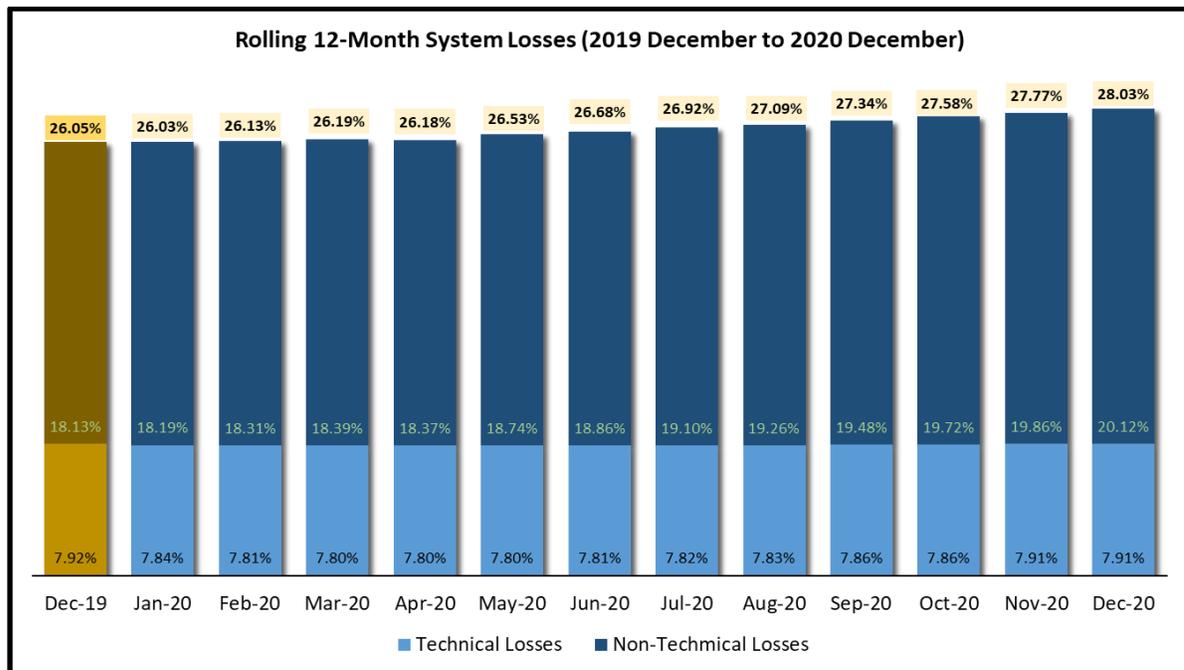
JPS' 2020 ENERGY LOSS SPECTRUM: MONTHLY BREAKDOWN														
TYPES	LOSS CATE-GORY	2019 DEC	2020 JAN	2020 FEB	2020 MAR	2020 APR	2020 MAY	2020 JUN	2020 JUL	2020 AUG	2020 SEP	2020 OCT	2020 NOV	2020 DEC
TL	Transmission	2.22%	2.14%	2.11%	2.10%	2.10%	2.10%	2.11%	2.12%	2.13%	2.16%	2.16%	2.21%	2.21%
	Primary Distribution	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
	Distribution Transformers	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%	1.30%
	Secondary Distribution	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%	2.90%
	Total TL	7.92%	7.84%	7.81%	7.80%	7.80%	7.80%	7.81%	7.82%	7.83%	7.86%	7.86%	7.91%	7.91%
NTL	Rate 70	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Rate 60	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Rate 50	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%
	Rate 40	0.36%	0.36%	0.35%	0.36%	0.36%	0.36%	0.36%	0.36%	0.36%	0.37%	0.37%	0.37%	0.37%
	RT20 (Med)	0.40%	0.40%	0.40%	0.40%	0.40%	0.39%	0.39%	0.39%	0.39%	0.38%	0.38%	0.38%	0.37%
	RT20 (Res)	0.23%	0.23%	0.23%	0.23%	0.23%	0.23%	0.22%	0.22%	0.22%	0.22%	0.22%	0.22%	0.21%
	RT10	6.16%	6.15%	6.14%	6.16%	6.20%	6.03%	6.31%	6.35%	6.39%	6.43%	6.52%	6.52%	6.57%
	Sub-Total	7.21%	7.20%	7.19%	7.21%	7.26%	7.30%	7.35%	7.40%	7.43%	7.46%	7.51%	7.55%	7.59%
	JPS Internal	0.71%	0.72%	0.87%	0.88%	0.65%	0.76%	0.66%	0.69%	0.66%	0.69%	0.69%	0.64%	0.65%
	Illegal Users	10.22%	10.27%	10.26%	10.29%	10.47%	10.67%	9.33%	11.02%	11.18%	11.33%	11.52%	11.68%	11.87%
Total NTL	18.13%	18.19%	18.31%	18.39%	18.37%	18.74%	18.86%	19.10%	19.26%	19.48%	19.72%	19.86%	20.12%	
Total		26.05%	26.03%	26.12%	26.19%	26.18%	26.53%	26.68%	26.92%	27.09%	27.34%	27.58%	27.77%	28.03%
LOSS (GWh)		1,153.9	1,156.4	1,165.5	1,165.8	1,159.0	1,166.3	1,164.8	1,169.3	1,172.2	1,117.5	1,180.5	1,180.8	1,184.8
NET GEN (GWh)		4,429.9	4,442.3	4,427.8	4,451.8	4,427.8	4,395.5	4,336.3	4,343.1	4,326.4	4,307.0	4,280.6	4,252.1	4,227.4

8.6.2. The data in Table 8.2 above indicates that:

- 1) Both technical losses (TL) and non-technical losses (NTL) are mainly concentrated in the distribution network and account for over 80% of the total System Losses. The data also shows that NTL continues to be driven by “Illegal Users” and inefficiencies within JPS’s operations;
- 2) Total TL recorded at the end of 2020 December was 7.91% of annual net generation, marginally lower than the 2019 December level of 7.92%;
- 3) Total NTL estimated at the end of 2020 December was 20.12% of annual net generation, 1.99% higher than the 2019 December level of 18.13%. This, according to JPS, was due to the effects of the COVID-19 pandemic on its operations;
- 4) NTL due to large C&I (Rate 40&50) and Medium C&I (Rate 20) customers continue to be relatively high based on industry standards, despite the advanced metering capabilities, including the use of “check” meters for these accounts;
- 5) NTL attributable to residential customers (Rate 10) at the end of 2020 December was 6.52% of annual net generation, reflecting an increase of 0.36% relative to the 2019 December level (6.16%), despite JPS’s mass deployment of advanced metering infrastructure (AMI) and other targeted loss-reduction initiatives in 2020 to address energy losses in this customer class.

- 6) NTL caused by “Illegal Users” (non-customers) increased by 1.41% of net generation from 10.27% in 2019 December to 11.68% at the end of 2020 December, which is the major contributor to the overall increase in NTL in 2020. Notably, the number of “Illegal Users” estimated by JPS has remained constant at 180,000, but the associated annual energy consumption increased considerably by approximately 11% from 452,607 MWh in 2019 to 501,914 MWh in 2020. JPS claims that this increase in NTL is due to increased levels of unauthorized electricity abstraction and consumption by the “Illegal Users” category influenced by the COVID-19 conditions during 2020. However, that argument may be counter-intuitive, given that the historical System Losses data indicates some level of saturation in this category and that the reported increase in consumption (kWh) may not be possible without a significant increase in the number of “Illegal Users”;
- 7) While the total System Losses on a percentage basis increased from 26.05% of annual net generation in 2019 to 28.03% at the end of 2020, actual energy losses for 2020 (measured in MWh) have only increased by 2.3% relative to the 2019 losses. The System Losses trend during 2020 is illustrated in Figure 8.3 below;
- 8) The system annual net generation (the base used to convert actual System Losses measured in MWh to a percentage basis), decreased from 4,451.8 GWh in 2020 March to 4,227.4 GWh in 2020 December, due to declining “billed sales” triggered by the effects of the COVID-19 pandemic during the year. This decrease in the 2020 net generation is the main factor that influenced the change in System Losses from 26.05% in 2019 to 28.03% in 2020, based on the mathematical construct.

Figure 8.3 – JPS’s Monthly System Losses Trend (2019 December – 2020 December)



8.7 JPS 2020 System losses reduction programme

8.7.1. To support JPS’s 2019-2023 loss reduction programme, the Office during the 2019-2024 Rate Review process approved a number of loss reduction projects included in its 5-year capital investment plan, which are captured in the 2019-2024 Determination Notice. The status of these approved projects, as presented in the 2021 Annual Review Filing, is summarized in Table 8.3 below.

Table 8.3 – Status of JPS’s 2020 Loss Reduction Projects

STATUS OF JPS 2020 LOSS REDUCTION PROJECTS					
Projects	OUR Approved CAPEX (US\$'000)	Planned Scope	Actual Scope	Planned Impact	Actual Impact
2020 TECHNICAL LOSSES INITIATIVES					
Voltage Standardization Programme (VSP)	-	Planned for 2019 implemented 2020 1. Oracabessa 110 2. Oracabessa 210	Planned for 2019 implemented 2020 1. Oracabessa 110 2. Oracabessa 210	674 MWh (0.015%)	In the process of being evaluated. 2019 projects would have been realized in 2020.
	3,434	2020 Projects 1. UWR 110 2. UWR 210	2020 Projects 1. UWR 110 2. UWR 210	132 MWh (0.003%)	TL reduction will be realized during 2021
Distributed Generation (DG)	-	10 MW CHP Plant	To be commissioned in 2021	600 MWh (0.014%)	To be Determined after plant commissioning
TOTAL TL				1.406 GWh (0.032%)	
2020 NON-TECHNICAL LOSSES INITIATIVES					
Smart Meters	8,677	100,000	69,697	12.1 GWh	19.2 GWh
Audits & Investigations	-	95,806	81,624		
Analytics Tooling	302	2 tools	2 tools		
Upgrading Metering Infrastructure	200	12 points	12 points		
RAMI	3,020	5,000	558		
Community Renewal	-	500	713	4.3 GWh	10.8 GWh
Strike Force	-	500	1,395		
TOTAL NTL	12,198			16.4 GWh	30.0 GWh

8.8 Issues related to JPS’ 2020 System Losses Projects developments

8.8.1. The OUR’s review of JPS’s 2020 loss reduction project developments identified a number of pertinent issues. These are outlined in Table 8.4 below.

Table 8.4 – Issues Related to JPS’s 2020 System Losses Projects

OUR COMMENTS/ISSUES ON JPS 2020 SYSTEM LOSSES PROJECTS
2020 TECHNICAL LOSSES REDUCTION PROJECTS
Voltage Standardization Programme (VSP)
<p>From a System Losses perspective, the aim of the VSP is to reduce the current in primary distribution conductors by upgrading all distribution feeder voltages to 24 kV. As reported by JPS, in 2019 two (2) feeders from its Oracabessa substation were converted from 12 kV to 24 kV under the VSP, which it purports would result in the reduction of TL in 2020. However, in the 2021 Annual Review Filing, JPS indicated that the impact of the 2019 VSP initiatives was still being assessed and would be submitted to the Office by June 2021 as part of its response to the Office’s request for a primary distribution assessment. However, that report is still outstanding.</p> <p>With respect to the 2020 VSP initiatives, in JPS’s 2019-2024 Rate Review Application, the company proposed a number of VSP projects for implementation in 2020, and projected that they would reduce TL by 0.02% of net generation. Correspondingly, in the 2019-2024 Determination Notice, the Office approved a total CAPEX of US\$3.434M to support the proposed 2020 initiatives, which included projects to upgrade the UWR 110 and 210 feeders from 12kV to 24kV, as well as the Highgate 110 and 210, and Blackstonedged 110 feeders, which were to be completed in 2021. While the company has reported that its 2020 VSP projects have been completed, the specific completion times for the respective projects were not provided. Further, the associated TL reduction impact has not been quantified. These deficiencies have created a major challenge for the OUR in assessing the impact of these approved 2020 VSP projects. Additionally, it appears that there is some level of discrepancy in JPS’s reporting of the 2020 VSP capital projects status. In one instance (Table 2-7, Page 49 of the 2021 Annual Review Filing), JPS claims that the 2020 VSP projects have been completed. However, elsewhere in the Filing (page 75), the company indicates that it spent US\$2.0M in 2020 and completed the upgrade of the UWR 110 and 210 feeders, with works on the Highgate and Blackstonedged feeders delayed to 2021 mainly due to the impact of COVID-19 on the project roll-out. These issues require explanation from JPS.</p>
Distributed Generation (DG) Project
<p>Based on project documents previously submitted to the OUR, JPS has partnered with Caribbean Broilers (CB) and New Fortress Energy (NFE) to commission a 10MW combined heat and power (CHP) distributed generation (DG) facility in Hill Run, St Catherine, at a total capital cost of US\$9.00M. In the 2021 Annual Review Filing, JPS indicated that this DG project, is the first of its kind in Jamaica, and is at an advanced stage of installation and commissioning, and is projected to start commercial operations in 2021. The OUR notes that no specific commissioning schedule and Commercial Operations Date (COD) was provided by JPS. This information is necessary not only for TL assessment, but is also critical for regulatory review of the generation system and Heat Rate determinations. As such, JPS is required to submit a detailed report on the implementation status of the project to the Office, within one (1) month of the effective date of this Determination Notice.</p>
2020 NON-TECHNICAL LOSSES REDUCTION PROJECTS
<p>As represented in the 2021 Annual Review Filing, the NTL reduction projects described in Table SL.3, which were undertaken by JPS in 2020 resulted in overall annual avoided energy losses of 30.0 GWh (approximately 83% higher than the projected impact), translating to 0.71% of net generation. However, the discrete impact of the respective projects was not stated. In addition, it is not clear whether the energy losses detected by JPS during the 2020 accounts audits/investigations, which were billed to customers as recoverable energy volumes, were factored in the reported 2020 NTL reduction impact of 30.0 GWh. These issues have imposed constraints on the OUR’s ability to assess the effectiveness of the NTL projects approved in the 2019-2024 Determination Notice and need to be rectified by JPS. Going forward, the company is required to distinctly report the specific NTL reduction impact resulting from each of the approved NTL projects, during the applicable reporting period.</p>

8.9 OUR’s Position – JPS 2020 Loss Reduction Project Status

8.9.1. Given that capital expenditure was approved for JPS’s 2020 loss reduction projects, some of which were incomplete at the end of the year, and considering that CAPEX was approved for loss reduction projects planned for 2021. This may create some degree of overlap. the OUR believes that it is prudent for JPS to present a revised strategy involving some degree of recalibration of the programme’s execution plan and timetable to steer it back on a normal track. This approach is contemplated with the aim of ensuring that the company within the defined project implementation timeframes, can achieve the established programme objectives during the remaining years of the 2019-2024 revenue cap period, despite prevailing operational challenges.

8.10 JPS loss Reduction projects planned for 2021

8.10.1. According to the 2021 Annual Review Filing, in 2021, JPS plans to implement the loss reduction projects described in Table 8.5 below.

Table 8.5 – JPS’s Loss Reduction Projects Planned for 2021

JPS' 2021 LOSS REDUCTION PROJECTS			
2021 Projects	OUR Approved CAPEX (US\$'000)	Forecasted Loss Reduction Impact	Remarks
VSP	3,196	0.635 GWh	JPS plans to upgrade three (3) additional feeders from 12 kV to 24 kV (Highgate 110 & 210 and Blackstonedged 110 feeders in St. Mary)
DG	-	0.600 GWh	The JPS/CB 10 MW CHP Hill Run Project scheduled to be completed in 2021, is expected to reduce TL in the T&D network.
TOTAL TL		1.235 GWh	
RAMI	4,788	17.600 GWh	JPS intends to target ten (10) communities for RAMI installations to convert 7,000 of these Illegal Users to regular customers.
Smart Meter Programme	14,588	21.000 GWh	42,000 Revenue Meters (AMI) and 3,000 Transformer Meters to be installed in St James and sections of KSAS.
Audit and Investigations	-		Approximately 85,000 audits to be conducted in 2021.
Social Initiatives	-	6.000 GWh	Regular Community Renewal Initiatives. New social programmes planned for piloting in 2021.
TOTAL NTL		45.500 GWh	

8.11 OUR’s Comments on JPS’s 2021 Loss Reduction Projects

8.11.1. JPS has forecast that the 2021 TL projects to be implemented in 2021 will yield a total reduction in TL of 1.235 GWh (0.029% of net generation), with the JPS/CB 10MW DG project accounting for 0.600 GWh (0.014%). However, with the absence of specific project completion dates, there is some uncertainty surrounding the level of TL reduction expected in 2021. As it relates to the DG project, JPS has forecast that it will reduce TL by 0.014% of net generation in 2021, and 0.04% in total over the 2021-2023 period. However, as previously indicated, JPS provided no specific commissioning schedule and Commercial Operations Date (COD). This therefore raises issues as to the basis of the forecast TL impact, given that at this point in 2021, the DG facility is not yet commissioned into service. This needs to be addressed by JPS.

8.11.2. For the 2021 NTL projects, JPS estimates the resulting loss reduction as 45.50 GWh (1.08% of net generation). However, the impact of the smart meter projects was aggregated with that of other initiatives and not separately stated. As such, their specific and distinct contribution to NTL reduction in 2021 could not be assessed. Additionally, as indicated in Table 8.5 above, the 2021 smart meter projects will be confined to areas in St. James and KSAS, and not broadly across the service areas, given the distribution of NTL across the system, with no specific reasons provided. These issues need to be addressed by JPS.

8.12 JPS’s 2021 Annual Review System Losses Proposals and Positions

8.12.1. For the 2021 Annual Review adjustment, JPS’s System Losses proposals and 2020 System Losses performance measurements, as presented in the Filing are delineated in the sections below.

JPS's Position on the Office's Determination and 2020 System Losses Targets

8.12.2. In the 2021 Annual Review Filing, JPS asserted that the 2019 and 2020 System Losses targets set by the Office during the 2019-2024 Rate Review Process are “retroactive targets” and should not be applied to the Y-Factor. The OUR disagrees with these assertions based on the following key reasons:

- 1) JPS's reference to the Office's determined System Losses targets for 2019 and 2020 (outlined in Chapter 14 of the 2019-2024 Determination Notice), as being retroactive, is not an appropriate designation, as it implies that the Office intends to do backward adjustments in relation to the Y-Factor, which is not the case. Regarding the 2019 targets, JPS would have been aware that by virtue of the introduction of the ALRIM programme in the 2018 Annual Review & Extraordinary Rate Review process, the System Losses target for 2019 would be necessary, as there was a connection between that target and the ALRIM-2 programme arrangement.
- 2) With respect to the approved 2020 System Losses targets, the requirements of the Licence dictate that these targets would be applicable at the 2021 Annual Review.
- 3) JPS would also be mindful that relevant targets applied at the 2018 Annual Review would represent a default position since no rate adjustment was effected since the effective date of 2018 Annual Review Determination Notice, which suggests that the company would have some indicative reference of target levels for 2020.
- 4) Despite the timing of the 2019-2024 Determination Notice, as reported in the 2021 Annual Review Filing, the company was still able to execute a number of loss reduction projects and initiatives during 2020, most notable, the installation of 69,697 smart meters (AMI) and 81,624 account audits/investigations under COVID-19 conditions. This appears to be a fair achievement, and would infer that JPS's loss reduction strategy may not have been materially impacted by the delayed 2019-2024 Determination Notice.
- 5) While it is true that the approved capital expenditure for JPS's 2020 loss reduction projects was delayed, these investment costs are already embedded in the company's cost structure and are currently being recovered through the non-fuel rates. Notably, even while contending that the 2020 targets should not apply, JPS has not proposed that the approved 2020 capital expenditure for System Losses reduction should be returned.

8.12.3. As established in the 2019-2024 Determination Notice and supported by the above reasoning, the OUR maintains its decision on the 2019 and 2020 System Losses targets. Accordingly, the 2020 targets will be used to determine the 2020 Y-Factor for the “ART” adjustment at this 2021 Annual Review.

JPS's Proposed 2020 System Losses Parameters and Y-Factor for TULos₂₀₂₀

8.12.4. As indicated, for the 2021 Annual Review Filing, JPS used the actual 2020 System Losses performance data and the approved 2020 System Losses targets captured in Determination #21 of the 2019-2024 Determination Notice, to derive the 2020 Y-Factor and related TULos₂₀₂₀. JPS's proposed 2020 System Losses parameters for Y-Factor adjustment is provided in Table 8.6 below.

Table 8–6 - JPS’s Proposed 2020 System Losses Parameters for Y-Factor Adjustment

2020 SYSTEM LOSSES PARAMETERS FOR Y-FACTOR						
DESCRIPTION	TL	JNTL	GNTL	TOTAL	RF	REMARKS
2020 Y-FACTOR ADJUSTMENT						
2020 ACTUAL	7.91%	5.82%	14.30%	28.03%	-	Losses taken from 2020 December ELS
OUR 2020	7.78%	4.71%	11.58%	-	20.00%	2019-2024 DETERMINATION NOTICE
NO Y-FACTOR FOR 2020: IF TRIBUNAL RULING OVERTURNS OUR TARGETS						
JPS DECLARED	7.78%	4.71%	11.58%			2021 Annual Review Filing
JPS PROPOSED TARGET	7.78%	4.71%	11.58%		10.00%	2021 Annual Review Filing

OUR’s Observations and Comments – 2020 System Losses Parameters

- 8.12.5. The data presented for the “No Y-Factor” scenario appears to be misrepresented because the proposed actual TL, JNTL and GNTL values are equivalent to the OUR targets and do not aggregate to the 2020 actual System Losses of 28.03%, which is erroneous.
- 8.12.6. In the Annual Review Filing, JPS intimated that in the absence of a stay by the Appeal Tribunal under Condition 32(1(iii) of the Electricity Licence, pertaining to matters involving System Losses, the approved 2020 targets in the 2019-2024 Determination Notice remain in effect until an award of the Tribunal is issued giving rise to the contrary. On this subject, JPS’s view regarding pending Tribunal decisions is noted, however, the OUR maintains its position that the determined 2019-2023 targets are reasonable and achievable, and will be applied at the relevant Annual Review adjustments, subject to the Tribunal’s ruling.

8.13 JPS's 2020 Y-Factor and related “TULos2020” Computations

- 8.13.1. Using the System Losses data shown in Table 8.6 above, JPS computed the 2020 Y-Factor and related “TULos2020”, which is demonstrated in Figure 8.4 below. Notably:
- JPS’s computations with the approved 2020 System Losses targets and corresponding actual TL, JNTL and GNTL values, yielded a 2020 Y-Factor of **-1.78%**.
 - In contrast, JPS’s defined Tribunal-related scenario with the 2020 Y-Factor equating to **0.00%**, produces a “TULos2020” of zero (0), resulting in J\$0.00 adjustment to the 2021 ART.

Figure 8.4 – JPS’s 2020 Y-Factor and related “TULos₂₀₂₀” Computations

System Losses Adjustment TULos ₂₀₂₀				
Line	Description	Formula	Value OUR Approved Targets	Value JPS Proposed Targets
L1	Actual TL ₂₀₂₀		7.91%	7.78%
L2	Target TL ₂₀₂₀		7.78%	7.78%
L3	Y _{a2020}	(L2-L1)	-0.13%	0.00%
L4	Actual JNTL ₂₀₂₀		5.82%	4.71%
L5	Target JNTL ₂₀₂₀		4.71%	4.71%
L6	Y _{b2020}	(L5-L4)	-1.11%	0.00%
L7	Actual GNTL ₂₀₂₀		14.30%	11.58%
L8	Target GNTL ₂₀₂₀		11.58%	11.58%
L9	RF		20.00%	10.00%
L10	Y _{c2020}	(L8-L7)*L9	-0.5440%	0.00%
L11	Y ₂₀₂₀	L3 + L6 + L10	-1.78%	0.00%
L12	ART ₂₀₂₀		41,211,019,369	41,211,019,369
L13	TULos ₂₀₂₀	L11*L12	(735,204,586)	0

JPS’s Comments on 2020 True-up Losses Adjustment

8.13.2. In its comments on the 2020 Y-Factor adjustment, JPS noted that while it has included a System Losses penalty in the 2021 ART for this Annual Review, it believes that the target true-up for System Losses should not be applicable for 2020 based on the following grounds:

- 1) The subject targets are applicable to periods prior to the effective date of the Final Determination and targets cannot be applied retroactively.

The OUR’s response is as follows:

- JPS’s claim that the 2020 true-up losses should not be applicable because the 2020 targets are retroactive is not accepted. It is notable that the existing price control regime operates on a forward-looking revenue cap principle, in which the annual revenue targets are set at the 5-year Rate Review then adjusted at subsequent Annual Reviews through the PBRM mechanism. According to the Licence, the Office should set annual System Losses targets for each year in the relevant revenue cap period. Subject to these requirements, for the 2019-2024 Rate Review Process, regardless of timing issues, the Office is still required to set System Losses targets for each year in the 2019-2024 review period. JPS’s argument that the Office has set retroactive targets is therefore not tenable.
- Specifically, as it relates to the approved 2020 targets in the 2019-2024 Determination Notice, the Licence requirements relevant to the PBRM dictate that these targets would be applicable to the Y-Factor at the 2021 Annual Review adjustment.

- Accordingly, the Office maintains its position that the approved 2020 System Losses targets (TL = 7.78%, JNTL = 4.71%, and GNTL = 11.58%) will be applied.

2) The system losses targets were set at the height of the COVID-19 pandemic, are not reasonable and achievable, and therefore inconsistent with the requirements of paragraph 37 of Schedule 3 of the Electricity Licence.

8.13.3. The OUR disagrees with this assertion on the premise that during the 2019-2024 Rate Review Process, the Office took into account the impact of the COVID-19 pandemic in the setting of the annual System Losses targets for 2020 to 2023, the details of which are captured in the 2019-2024 Determination Notice.

JPS’s Proposal for revision of OUR’s 2021 Targets

8.13.4. According to the 2021 Annual Review Filing, JPS’s 2021 loss reduction initiatives are expected to avoid approximately 1 GWh of TL and about 55 GWh of NTL, by the end of the year. It was also indicated that when these projected gains are factored into JPS’s system models, they estimated annual net generation and energy sales for 2021 of 4,321 GWh and 3,123 GWh, respectively, which translates to total System Losses of 1,198 GWh or 27.41% of net generation. On that basis, JPS has proposed that the 2021 System Losses set by the Office during the 2019-2024 Rate Review process should be revised to the targets presented in Table 8.7 below.

Table 8.7: JPS’s Proposal - Revised System Losses Targets for 2021

JPS REVISED SYSTEM LOSSES TARGETS FOR 2021	
System Loss Component	Target
Technical loss	7.90%
Non-Technical Loss fully within the control of JPS	6.61%
Non-Technical Loss not fully within the control of JPS	12.90%
Total	27.41%
RF	10.00%

8.13.5. Additionally, JPS posited that RF should be 10% for the reasons it outlined in its 2019-2024 Rate Review application.

OUR’s Position – JPS’s Proposal for Revision of 2021 targets

8.13.6. The Office rejects JPS’s proposal to adjust the 2021 System Losses targets approved in the 2019-2024 Determination Notice to those in Table 8.7 above, on the basis that no sound justification was provided by JPS to substantiate the proposed revision of the targets.

1) The 2021 System Losses performance scenario had already been fully and appropriately assessed during the 2019-2024 Rate Review Process and the relevant targets determined, taking into consideration the requirements of the Licence, the approved 2021 capital expenditure loss reduction projects, ongoing loss reduction measures (account audit, meter investigations etc.), projected penetration of Smart Meter project

(AMI meters), and scope for recovering revenues associated with energy loss via some modes of NTL.

- 2) The Office-approved 2021 targets are deemed to be reasonable and achievable and represents a fair allocation of the System Losses burden between the “Ratepayers” and JPS, in the context of the shared responsibility for System Losses.
- 3) Accordingly, the Office’s position is that the 2021 System Losses targets (TL = 7.72%, JNTL = 4.58%, and GNTL = 11.50%) will stand.

OUR’s Evaluation of JPS’s 2020 System Losses

8.13.7. In its initial review of the System Losses aspects of the 2021 Annual Review Filing, the OUR identified information gaps which created the need for additional System Losses data, necessary to facilitate a thorough assessment of the 2020 System Losses performance. The additional information was requested from JPS via letter dated 2021 June 4, and includes the following:

- 1) The System Losses reported in JPS’s monthly ELS for 2020 (January – December), submitted to the OUR on 2021 March 24, were not fully disaggregated as required by the regulatory reporting requirements. These aspects include:
 - a) The “Primary Distribution” component of Technical Losses (TL) as reported are not separated into “primary distribution line losses” and “distribution transformer losses”. JPS should disaggregate the “Primary Distribution” TL into the stated constituents, as required.
 - b) Non-Technical Losses (NTL) due to “Illegal Users” and “Internal Losses” are combined and not reported as separate components of NTL. JPS should disaggregate these NTL into separate elements, as required.
- 2) JPS’s field investigation data on NTL for 2019 and 2020 in MS Excel format, including details of account audits, meter inspections, and other related investigations, and showing the sources and modes of NTL detected.
- 3) A Report on the number of AMI, including Transformer/Total Meters, and “Check Meters” installed in the network up to 2021 May, which shall include a breakdown by Customer Class and by Parish.
- 4) An update on other Loss Reduction Projects in progress.
- 5) A breakdown of the System Losses for the following elements in the T&D network:
 - a) Each transmission line
 - b) Each HV substation
 - c) Each Distribution Feeder
 - d) Each Distribution Transformer

8.13.8. All the requested data was submitted by JPS up to 2021 July 12, which was reviewed by the OUR and was found to largely satisfy the information requirements. Subsequently, the OUR carried out a full technical evaluation of JPS’s 2021 Annual Review System Losses proposals and the 2020 System Losses performance measurements, including all supporting schedules and data submitted by JPS. This evaluation/analysis was necessary to facilitate the calculation of the 2020 Y-Factor required for the derivation of the “TULos2020” component of the 2020 Revenue Surcharge.

OUR's 2020 System Losses Performance Analysis

- 8.13.9. During the 2019-2024 Rate Review process, JPS in its response (dated 2020 September 8) to the 2019-2023 System Losses targets set out in the OUR's draft Determination Notice (submitted to JPS in 2020 July), proposed "revised targets", arguing that a revision of the original System Losses projections included in its 2019 Rate Review application was necessary to account for the impact of COVID-19, which was unforeseen prior to the submission of the said application.
- 8.13.10. The revised System Losses proposals were evaluated by the OUR during the Rate Review Process, taking into account the COVID-19 effects on system operating parameters, particularly system net generation, electricity sales and average system losses. The results of this evaluation indicated that the prevailing COVID-19 conditions were likely to result in some adverse consequences on System Losses within the 2020-2021 timeframe.
- 8.13.11. As it relates to the 2020 System Losses projections (COVID-19 related), the revised total System Losses target proposed by JPS for 2020 was 29.33% (100% of forecast). In contrast, the OUR's System Losses forecast for 2020 was 27.60% of net generation. As it turned out, the actual System Losses recorded for 2020 as reflected in the 2020 ELS is 28.03% of net generation. Based on the OUR's review of the relevant system performance data, the reported 2020 System Losses of 28.03% was validated as accurate. The referenced 2020 System Losses forecast and the actual 2020 System Losses performance is presented in Table 8.8 below.

Table 8.8 - 2020 System Losses Forecasts versus Actual Performance

2020 SYSTEM LOSSES FORECAST vs ACTUAL PERFORMANCE						
Loss Component	JPS's Original Forecast - COVID-19 Impact [2019 Rate Review]	JPS's Revised Forecast - COVID-19 Impact [2019 Rate Review]	OUR's 2020 Forecast - COVID-19 Impact [2019 Rate Review]	Actual Losses (2020 ELS)	Variance (JPS's COVID-19 Forecast vs Actual)	Variance (OUR COVID-19 Forecast vs Actual)
TL	7.92%	7.85%	7.81%	7.91%	-0.06%	-0.10%
NTL	17.61%	21.48%	19.78%	20.12%	1.36%	-0.34%
- JNTL	5.86%	7.54%	6.58%	-		
- GNTL	11.75%	13.94%	13.19%	-		
TOTAL LOSSES	25.53%	29.33%	27.60%	28.03%	1.36%	-0.44%
NET GEN (GWh)	4,359.4	-	4,268.5	4,227.4		

- 8.13.12. The data shows that JPS's 2020 System Losses forecast (29.33%) was overestimated by a margin of 1.30% of net generation. By comparison, the OUR's 2020 projection converged closer to the actual performance with a much smaller deviation of just -0.44%.

Allocation of 2020 NTL – (JNTL and GNTL)

- 8.13.13. Utilizing the NTL allocation model described in the "Final Criteria" and the 2019-2024 Determination Notice, and taking into account JPS's 2019 & 2020 NTL Source Data and previous NTL causation data, the OUR estimated the 2020 JNTL and GNTL allocations

to be 6.17% and 13.95% respectively, which are reflected in the 2020 NTL distribution provided in Table 8.9 below.

Table 8.9 – OUR’s 2020 NTL Distribution – (JNTL and GNTL)

2020 NTL DISTRIBUTION - JNTL AND GNTL						
Description	NTL	OUR JNTL	OUR GNTL	JPS JNTL	JPS GNTL	Remarks
2020 NTL (Actual)	20.12%	6.17%	13.95%	5.82%	14.30%	OUR’s NTL Distribution based on JPS’s 2019 & 2020 Source Data and previous NTL Datasets. Basis for JPS’s NTL allocation not stated.
2020 NTL (Actual) - Proportions	100.00%	31.00%	69.00%	29.00%	71.00%	

8.13.14. A salient observation from this NTL breakdown is that the OUR’s 2020 JNTL and GNTL allocations are quite similar to those derived by JPS, with relatively small variances for the respective components. In that regard, it should be noted that the OUR’s NTL distribution methodology is predicated on a practical and robust approach and has been consistently applied. Against that background, it comes as no surprise that JPS’s own JNTL and GNTL allocations are converging towards those generated by the OUR. Furthermore, this indication serves to invalidate the claims that the OUR’s NTL distribution methodology is unsuitable and the resulting JNTL and GNTL allocations are unreasonable.

8.13.15. Notwithstanding, despite the closeness of the JPS’s 2020 JNTL and GNTL allocations, the OUR’s determined 2020 JNTL and GNTL values were used to calculate the 2020 Y-Factor, as described in the section below.

8.14 Determination of JPS’s 2020 Y-Factor

8.14.1. To determine the 2020 Y-Factor, the actual (adjusted) TL, JNTL and GNTL values were measured against the established 2020 TL, JNTL and GNTL targets outlined in the 2019-2024 Determination Notice (presented in Table 8.1 above), and dictated by the Y-Factor mechanism defined under Schedule 3 (Exhibit 1) of the Licence). The required computations and the resulting Y-Factor is presented in Table 8.10 below.

Table 8.10 OUR’s Derivation of JPS’s 2020 Y-Factor

2020 Y-FACTOR ADJUSTMENT FOR JPS’s 2021 PBRM							
Y-Factor	Description	2020 TARGETS	2020 ACTUAL	RF	TARGET	OUR 2020 Y-FACTOR	JPS 2020 Y-FACTOR
	2020 TL	7.78%	7.91%				
	2020 JNTL	4.71%	6.17%				
	2020 GNTL	11.58%	13.95%				
	TOTAL	-	28.03%				
	RF	-	-	20.00%			
2020 Y-FACTOR ADJUSTMENT							
Ya	(TL Target – TL Performance)				-0.13%	-0.13%	-0.13%
Yb	(JNTL Target – JNTL Performance)				-1.46%	-1.46%	-1.11%
Yc	(GNTL Target – GNTL Performance)				-2.37%	-	-
	(GNTL Target – GNTL Performance) x				-	-0.47%	-0.54%
[Ya +	2020 Y-FACTOR					-2.06%	-1.78%

8.14.2. As shown, the Y-Factor resulting from the 2020 TL, JNTL and GNTL performance measurement is **-2.06%**. Based on the defined “ART” adjustment mechanism, this Y-Factor value will be used to derive the “TULos₂₀₂₀” component of the 2020 Revenue Surcharge.

8.15 System Losses Review - Issues and Positions

8.15.1. The findings and issues resulting from the OUR’s review of JPS’s System Losses proposals and supporting data during this 2021-2022 Annual Review process, are delineated in the sections below.

Office’s Request for Audits and Studies – JPS’s Concerns

8.15.2. In the 2019-2024 Determination Notice, the Office requested that JPS conduct several audits and studies to provide more in-depth information of the overall system loss situation. Specifically, the Office determined that:

- a) The company shall complete a full assessment of the primary distribution network TL, including the total number of feeders and total number of distribution transformers, within six (6) months of the effective date of this Determination Notice, and a copy of the assessment report submitted to the Office.
- b) The company shall submit a detailed report on the advanced meter programme up to 2020 June to the Office, addressing the scope, cost, benefits, and impact on NTL, within three (3) months of the effective date of this Determination Notice.
- c) The company shall conduct an independent study of NTL due to Illegal Users, to establish a credible baseline, to facilitate calibration of the reported NTL and regulatory decisions going forward. This study to be completed within six (6) months of the effective date of this Determination Notice, and a copy of the study report be submitted to the Office.

8.15.3. With regard to these determinations, JPS indicates that it fully supports any request to increase information and transparency but believes that the timelines of some of these requests were very aggressive. In addition, JPS asserts that the company and the Office are already engaged in the National Energy Loss Reduction Programme (NELRP) supported by the IDB, which contain request three (3) in its scope. As such, JPS proffered that it is advocating for the consolidation of request three (3) above with the NELRP, in order to avoid duplication of efforts and resources.

OUR’s Position

8.15.4. The OUR has recognized that some of requested System Losses related reports/deliverables have not been submitted by JPS as specified in the 2019-2024 Determination Notice, and no specific reasons have been provided by the company, which needs to be addressed.

8.15.5. In the case of the “smart meter programme”, a summary report was provided in response to the OUR’s request for additional information during this 2021 Annual Review process, which does not address all items to be included in the “detailed report” as specified in the 2019-2024 Determination Notice. While the detailed report was initially required to capture programme activities up 2020 June, given the timing of the Determination Notice,

and meter deployments since then, the Office believes that this report is still necessary. Accordingly, JPS is required to submit the requested “detailed report” to the Office, covering the smart meter programme developments up to 2021 June, with the contents stipulated in Chapter 14 (paragraph 14.184) of the 2019-2024 Determination Notice, within three (3) months of the effective date of this Determination Notice.

- 8.15.6. For the full assessment of the TL on the primary distribution network, JPS shall provide an update on the status of the study within one (1) month of the effective date of this Determination Notice, if the study is not yet concluded. Following which, the final study report shall be submitted to the Office by the end of 2021 September, as applicable.
- 8.15.7. Regarding the independent study of NTL due to “Illegal Users”, the Office has no objection with JPS’s proposal for consolidating this study with the NELRP, provided that the conditions specified in the 2019-2024 Determination Notice are satisfied. Further, it is also important for JPS to recognize that the Office will be reviewing RF (currently at 20%) at the 2022 Annual Review, and the results of this study will be critical for the OUR’s evaluation of RF at such time.

Modes and Sources of NTL

- 8.15.8. The OUR’s review of JPS’s 2019 and 2020 NTL investigation data, including details of account audits, meter inspections/investigations, and the detected sources and modes of NTL, submitted as part of the 2021 Annual Review Filing, revealed that JPS conducted over 73,000 customer account investigations in each of the stated years. In analyzing the reported data, OUR found that approximately 11% and 13% of the total number of accounts investigated by JPS in 2019 and 2020 respectively, were found with service-related irregularities. According to JPS, these detected irregularities constitute the main sources/modalities that are contributing to NTL. These irregularities include:
 - a) Defective Metering Equipment (meters, CTs, PTs, etc.)
 - b) Burnt/Damaged Meter
 - c) Meter tampering/bypass
 - d) Inverted Meter
 - e) Incorrect Metering Configuration
 - f) Cross Phasing
 - g) Single Phasing
 - h) Open Circuit
 - i) Line Tap at Pothead
 - j) Other
- 8.15.9. Notably, these sources/modes of NTL identified by JPS are found to be largely consistent with the OUR’s NTL causation factors elaborated in the 2019-2024 Determination Notice, which are considered the primary drivers of energy losses in the “Billed Customer” category of NTL.
- 8.15.10. From a statistical perspective, the total number of accounts investigated in each of the stated years (“sample size”), would represent an acceptable sample size for the respective total populations of 665,534 and 676,879 customer accounts, based on the 2019 & 2020

ELS data. This infers that the respective sample sizes, at a minimum, would achieve a statistical confidence level of 95% in the results, with confidence interval (margin of error) of 5%. Accordingly, it would be reasonable to deduce that the level of irregularities detected in each sample (number of accounts investigated annually) would be approximately the same across the total customer base, which is important for validation of NTL in the system, its distribution into JNTL and GNTL, and formulation of curtailment and mitigation strategies.

8.15.11. From the OUR's observations and findings, the following deductions are made:

- 1) The NTL data shows that energy losses due to billed customers (Rates 70, 60, 50, 40, 20 & 10), largely result from normal supply/service connection faults, meter infrastructure configuration problems and defects, and detectable meter irregularities, which can be corrected and mitigated, and are totally within JPS's control;
- 2) Based on the identified NTL causation factors, a significant portion of the resulting energy losses attributable to "Billed Customers" are regarded as recoverable. Accordingly, JPS should account for these losses as "recoverable energy" since they have been identified and quantified and can be translated to 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 classified as NTL in the ELS, on the basis that they can be quantified and billed to the relevant customers, for recovery of the associated revenues by JPS;
- 3) JPS can also seek to recover loss revenues associated with these sources of NTL by means of adjustments in accordance with the relevant "Back Billing Policy" or other means available to JPS for redress; and
- 4) The NTL investigation data indicates that the total number of customer accounts audited/investigated by JPS annually, exceeds the requirements of the Licence 2016 (Schedule 2, Overall Standards - EOS7a & EOS7b). The higher number of annual meter/account audits and investigation activities is acknowledged, and this trend should allow JPS to gather more valuable information, to enhance its energy loss detection, analytics and mitigation strategy.

8.15.12. In light of these considerations, the OUR therefore urges JPS to continue to employ the necessary efforts and take appropriate actions to address these elements of NTL to the benefit of the company, the "Rate Payers", the sector and the country as whole.

JPS's responsibility for certain components of NTL

8.15.13. Pursuant to ANNEX 3 of the Final Criteria, and the System Losses determinations in the 2019-2024 Determination Notice, JPS was assigned full responsibility (100%) for the following NTL components:

- Rate 60 - Streetlight/Stoplight/Interchange
 - Rates 40, 50 & 70 - Large C&I customer class
 - Rate 20 - Medium C&I customer class
- JPS's Internal/Unquantified NTL

8.15.14. This was based on the premise that these losses were totally under the control of JPS and the company had possessed advanced capabilities to detect and reduce them to zero.

However, based on the 2019 & 2020 ELS, these categories of NTL continue to exist at unacceptable levels, as shown in Table 8.12 below.

Table 8.12 - NTL Fully Assigned to JPS

NTL COMPONENTS (2019 - 2020)			
Components	2019 Dec ELS	2020 Dec ELS	Remarks
Wholesale (Rate 70)	0.00%	0.00%	
Streetlight/Stoplight (Rate 60)	0.00%	0.00%	SSP - should provide intelligent/remote consumption recording
Large C&I (Rate 50)	0.07%	0.06%	All accounts equipped with AMI and Check Meters
Large C&I (Rate 40)	0.36%	0.37%	All accounts equipped with AMI and Check Meters
Medium C&I (Rate 20)	0.40%	0.37%	
JPS Internal Losses	0.71%	0.65%	Caused by JPS' billing errors and internal process inefficiencies

8.15.15. Despite arguments posited by JPS defending these NTL levels, the OUR maintains that given the existing technological capabilities and other enhancements at JPS's disposal to address these losses, the current levels are unacceptable, and will not be passed on to the "Rate Payers". Therefore, in keeping with the OUR's position, JPS should reduce these losses to zero (0), as a matter of priority.

8.16 The OUR's Determination on JPS 2020 Y-Factor

8.16.1. In making its determination on JPS's 2020 Y-Factor, the Office took into consideration, among other things, the following:

- The results of the OUR's 2020 System Losses evaluation;
- The relevant provisions of the Licence; and
- The Q-Factor determinations set out in the 2019-2024 Determination Notice.

8.16.2. Accordingly, the Office determines that the 2020 Y-Factor applicable to the "TULos₂₀₂₀" for the 2021 "ART" adjustment is **-2.06%**.

Determination 14

Having reviewed the JPS's system losses performance and Y-Factor proposal the Office has determined the following:

- 1) The 2020 Y-Factor applicable to the 2021 Annual Revenue Target adjustment is -2.06%.
- 2) JPS's proposal for the revision of the Office determined 2021 System Losses targets is not approved.
- 3) JPS shall submit a "detailed report" to the Office, covering the "smart meter programme" implementation activities up to 2021 June, with the contents stipulated in Chapter 14 (paragraph 14.184) of the 2019-2024 Determination Notice, within three (3) months of the effective date of this Determination Notice.
- 4) JPS shall submit a detailed report on the implementation status of JPS/CB 10MW CHP DG project to the Office, within one (1) month of the effective date of this Determination Notice.
- 5) JPS shall comply with all System Losses related requirements specified in this Determination Notice.

9 Quality of Service (Q-Factor Adjustment)

9.1 Background

9.1.1. As part of the annual Performance Based Rate-Making (PBRM) mechanism, incorporated in JPS's price control regime, defined under Schedule 3 (Exhibit 1) of the Licence 2016, at each Annual Review during a revenue cap period, the OUR is required to measure JPS's annual quality of service performance for each year during the said revenue cap period versus the annual target set in the 5-year Rate Review Determination Notice, in order to derive the Q-Factor adjustment applicable to the Revenue Cap (RC), as per the annual PBRM framework.

9.2 Quality of Service Dimensions

9.2.1. In electric utility operations, quality of service requirements generally encompass three (3) main dimensions:

- Commercial Quality – involves specific performance measures (Guaranteed and Overall Standards);
- Power Quality – mainly addresses voltage quality of the utility's electricity supply; and
- Reliability of Supply – relates to overall system reliability and the continuity of electricity supply to customers.

9.2.2. As it relates to the Q-Factor provisions of the Licence 2016, the "reliability of supply" dimension forms the core of the defined Q-Factor mechanism, which is the main focus of this regulatory review.

9.3 Scope of OUR's 2020 Q-Factor Review

9.3.1. The OUR's evaluation of JPS's Q-Factor at this 2021-2022 Annual Review, encompasses among other things, the following activities:

- Assessment of JPS's system reliability performance for 2020, in terms of power outages in the various segments of the system, resulting in supply interruptions to customers;
- Analysis of outage causes to determine the main drivers of electricity supply interruptions and the focus of the JPS reliability improvement strategies; and
- Derivation of the defined quality indices and Determination of the Q-Factor applicable to the Revenue Cap for the 2021 annual PBRM adjustment.

9.4 Measurement of System Reliability

9.4.1. Reliable system operation is critical for ensuring acceptable service quality to customers. However, the effective management of system reliability is largely dependent on the accurate measurement and monitoring of system operating performance parameters. In order to achieve this objective, reliability performance metrics become useful as they provide a framework for quantitative reliability measurements and quality of service assessments. Additionally, reliability measurements and metrics are necessary to support

utility regulators in monitoring performance improvements and to establish performance targets and incentive mechanisms. Generally, for quality of service assessments, the reliability indices commonly used include:

- SAIFI – System Average Interruption Frequency Index;
- SAIDI – System Average Interruption Duration Index;
- CAIDI – Customer Average Interruption Duration Index; and
- MAIFI – Momentary Average Interruption Frequency Index.

9.4.2. In relation to the Q-Factor, the Licence 2016 clearly sets out the definition and conditions for computing SAIFI, SAIDI, and CAIDI (the prescribed quality indices), to facilitate the measurement of JPS's system reliability performance.

9.5 Licence Requirements for Q-Factor

9.5.1. For reference, the regulatory requirements applicable to the Q-Factor are defined under Schedule 3, Paragraphs 37, 39, and 46; and Exhibit 1 of the Licence 2016, as well as the Legal and Regulatory framework set out in this Determination Notice.

9.6 Regulatory Principles for Implementation of Q-Factor

9.6.1. For proper implementation of the Q-Factor, the OUR and JPS have established that, in principle, the Q-Factor should, among other things, provide proper financial incentive to deliver a level of service quality based on customers' view of the value of that service quality. Based on the reliability and quality of service requirements of the Licence 2016, the Q-Factor should be determined based on the average reliability performance across the entire electricity system. This means that all customers in the system should necessarily receive the same level of reliability, irrespective of their individual preferences. However, given the topology and geographical orientation of the system, and load density, among other things, this expectation is often not realized.

9.7 Design of Q-Factor Adjustment Mechanism

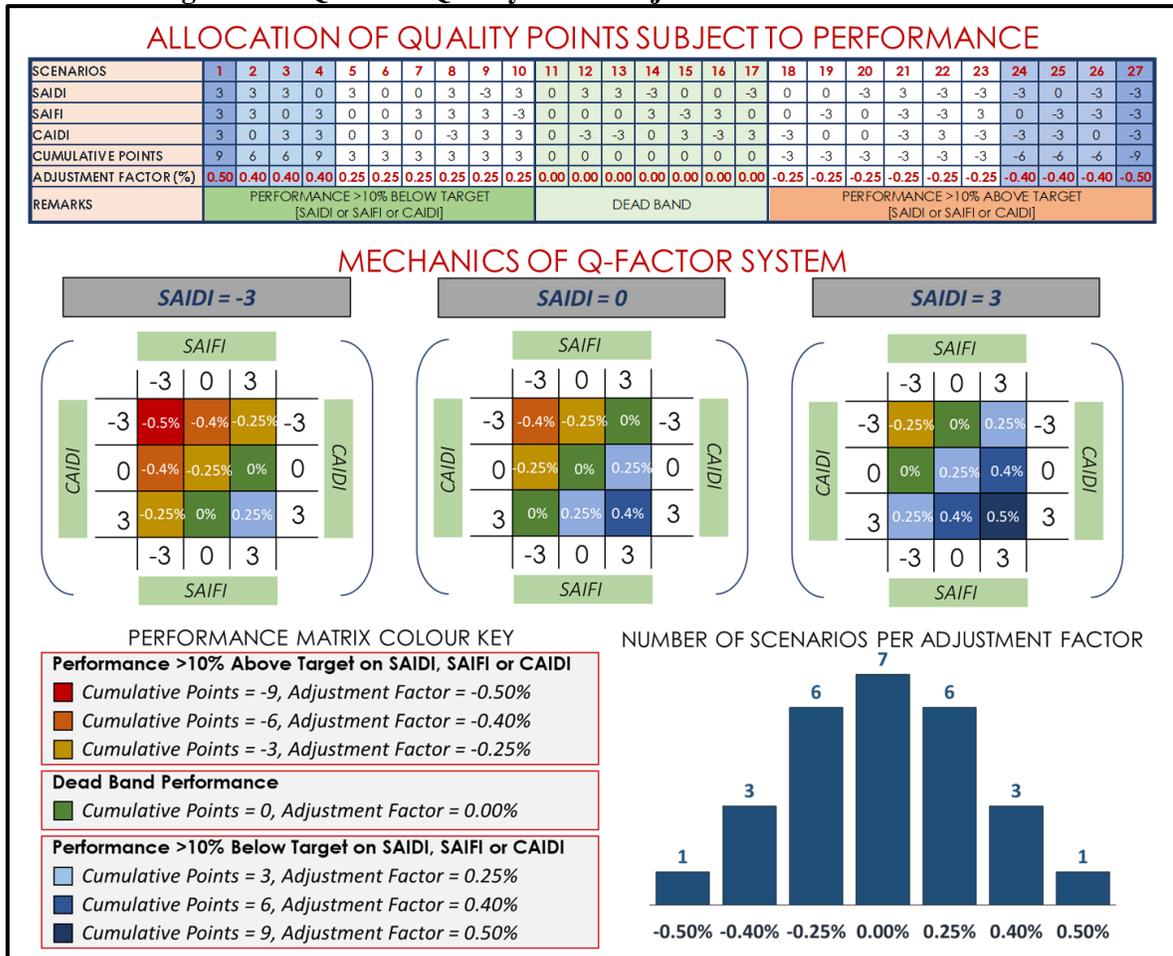
9.7.1. As prescribed by the Licence (Schedule 3, Exhibit 1), the "quality indices" upon which the Q-Factor is based are SAIDI, SAIFI and CAIDI. The measurement of JPS's annual quality of service performance using these three (3) quality indices is guided by the following performance criteria/quality points system:

- 1) Above Average Performance (greater than 10% below target) – worth 3 quality points on either SAIFI, SAIDI or CAIDI;
- 2) Dead Band Performance (within $\pm 10\%$ of target) – worth zero (0) quality points on either SAIFI, SAIDI or CAIDI; and
- 3) Below Average Performance (greater than 10% above target) – worth -3 quality points on either SAIFI, SAIDI or CAIDI.

9.7.2. Based on this framework, there are 27 performance scenarios with different combinations of SAIFI, SAIDI and CAIDI scores (3, 0 or -3) that are possible. The aggregation of the assigned quality points for each of these scenarios would yield cumulative quality points scores, ranging between -9 (minimum) and +9 (maximum). As outlined in the Licence 2016, the corresponding Q-Factor adjustment for these cumulative quality points for SAIFI, SAIDI and CAIDI, should range between a minimum of -0.50% and a maximum of +0.50%.

The Q-Factor quality points adjustment system as defined in the Licence 2016, is presented in Figure 9.1 below.

Figure 9.1 - Q-Factor Quality Points Adjustment Matrix



9.8 OUR Determined Q-Factor Baseline and 2020 Target

9.8.1. During the 2019-2024 Rate Review Process, the Office determined the Q-Factor baseline and the 2020 target for the computation of the Q-Factor adjustment to be applied to the PBRM at the 2021-2022 Annual Review. These determinations are set out in Chapter 15 of the 2019-2024 Determination Notice, and are presented in Table 9.1 below.

Table 9.1 - OUR Determined Q-Factor Baseline and 2020 Targets

Q-FACTOR BASELINE AND 2020 TARGETS FOR SAIFI, SAIDI & CAIDI				
OUTAGE DATA (Period)	DESCRIPTION	TARGET SAIDI (mins/customer)	TARGET SAIFI (interruptions/customer)	TARGET CAIDI (mins/interruption)
2016 – 2018	BASELINE	SAIDI _{BASE} (1,582)	SAIFI _{BASE} (12.9)	CAIDI _{BASE} (122.7)
2020 TARGETS	2021 – 2022 Annual Review	SAIDI _{BASE} × (1 – 0.05) = 1,502.9	SAIFI _{BASE} × (1 – 0.04) = 12.4	CAIDI _{BASE} × (1 – 0.01) = 121.5

9.9 JPS's SYSTEM 2020 Reliability Performance

9.9.1. In its 2021 Annual Review Filing, JPS submitted that the overall system 2020 reliability performance for 2020 was evaluated using the 2020 Annual Outage Dataset. According to JPS, the resulting reliability performance measurements, represented in terms of the SAIFI, SAIDI, CAIDI, and MAIFI are summarized in Table 9.2 below. Corresponding 2019 figures are also provided for reference.

Table 9.2 - JPS Reported System Reliability Performance for 2020

JPS's REPORTED 2019 & 2020 SYSTEM RELIABILITY PERFORMANCE					
YEAR	# Reportable forced outages	SAIDI (mins/customer)	SAIFI (interruptions/customer)	CAIDI (mins/interruption)	MAIFI (interruptions/customer)
2019	44,389	1,375.2	11.7	117.1	7.6
2020	57,726	1,486.8	8.6	173.2	13.8

9.10 MAIFI Related Issues

9.10.1. As shown, MAIFI is included as a reliability performance indicator. Unlike SAIDI, SAIFI and CAIDI, MAIFI is not a component of the Q-Factor mechanism. However, as stipulated by regulatory reporting requirements, JPS is required to report momentary interruptions to facilitate ongoing system assessments and regulatory monitoring. The MAIFI data shows that on average momentary interruptions per customer increased significantly (82%) in 2020 relative to that for 2019, reflecting a worsening in performance over the period. No specific reasons were provided by JPS to explain this large increase in MAIFI. While the company did indicate that the system reliability performance was impacted by three tropical storms in 2020, no direct link was made between these events and the increase in MAIFI. In fact, as shown later in this section, the largest cause contributor to MAIFI, was described as “unknown” by JPS, and not causes such as vegetation encroachment or lightning, which are usually the main drivers.

9.11 2020 SAIFI, SAIDI and CAIDI Calculated by JPS

9.11.1. The proposed indices are as follows:

- For SAIDI, the 2020 value is reported as 1,486.8 minutes/customer, which is 8% worse than the 2019 performance.
- With respect to CAIDI, the 2020 value (173.2 minutes/interruption) is 56% worse than the 2019 performance.
- In contrast, the 2020 SAIFI value (8.6 interruptions/customer) indicates a 26.5% improvement over the 2019 level.

9.11.2. According to JPS, increases in outage duration and response time in 2020 relative to those reported for 2019, as indicated in the respective SAIDI and CAIDI values, were due to impacts of the COVID-19 pandemic on its operation in 2020. JPS also claims that the effects of tropical storms Laura, Zeta and Eta had a negative impact on the overall system reliability, which according to the company is reflected in its 2020 SAIDI performance.

9.11.3. Based on the 2020 Annual Outage Dataset, the number of forced outages recorded by JPS during the periods of tropical storm activity in 2020 increased considerably compared to previous years. The outage data also indicates that the number of outages caused by

vegetation-related issues in 2020, increased significantly in comparison to those reported for previous years.

9.11.4. The OUR acknowledges that operational constraints imposed by COVID-19 and the effects of named tropical storms that occurred in 2020, may have had some negative impact on reliability performance. It is also recognized that tropical storms conditions impacting the island is a perennial issue, with the anticipation of storm intensity during the June-November period each year. However, it is not discernible how these three relatively weak tropical storms in 2020 could have inflicted such adverse consequences on system reliability, taking into consideration, the significant reinforcements/enhancements to the electricity network infrastructure effected by JPS to improve overall system resilience in recent years.

9.11.5. With respect to the SAIFI performance, JPS purports that the indicated improvement in this index is due to benefits realized from reliability improvement projects implemented during 2020. While the implementation of the 2020 reliability projects appears to have yielded some improvement in SAIFI, the OUR has also observed that the 2020 average customer count was appreciably higher relative to those of previous years, which would have also contributed to the reduction in JPS’s 2020 SAIFI.

9.12 JPS’s 2020 Reliability Improvement Programme

9.12.1. To support JPS’s 2019-2024 reliability improvement programme, the Office during the 2019-2024 Rate Review process, approved a number of reliability improvement projects included in its 5-year capital investment plan, which are captured in the 2019-2024 Determination Notice. The status of these approved projects, as provided in the 2021 Annual Review Filing, is summarized in Table 9.3 below.

Table 9.3- Status of Approved Reliability Projects in 2020 as Reported by JPS

STATUS OF JPS RELIABILITY PROJECTS IN 2020		
Projects	OUR Approved Capital Expenditure (US\$’000)	Project Status Reported by JPS
Voltage Standardization Programme	3,434	Completed
Grid Modernization Programme	1,645	Completed
Distribution Structural Integrity	4,489	Completed
Distribution Line Re-Contracting and Relocation	1,314	Deferred due to COVID-19 measures
Transmission Structural Integrity	1,770	Completed
Substation Structural Integrity	1,670	Completed
Distribution Transformer Replacement/ Upgrade Programme	2,798	Completed
TOTAL	17,120	

9.13 OUR’s Comments on JPS’s 2020 Reliability Projects Status

9.13.1. The OUR’s review of the JPS’s reported reliability project developments in 2020 reveals a lack of clarity and incongruence in relation to the level of capital expended, specific projected activities executed, validity of project status in 2020, and quantification of the associated reliability of impact. The issues are outlined in Table 9.4 below.

Table 9.4 – JPS’s 2020 Reliability Projects Related Issues

OUR COMMENTS/ISSUES ON JPS’s 2020 RELIABILITY PROJECTS
<p>PROJECT: Voltage Standardization Programme</p> <p>A total CAPEX of US\$3.434M was approved by the Office to support JPS’s 2020 Voltage Standardization Programme (VSP), which includes projects to upgrade the Upper White River (UWR) 110 and 210 feeders from 12kV to 24kV and to commence Highgate 110 and 210 as well as Blackstonedgedge 110 feeder upgrades, which were to be completed in 2021. In JPS’s 2019-2024 Rate Review Application, JPS projected that the implementation of the 2020 VSP projects would reduce SAIDI by 4.661 minutes/customer. While the company has reported that its 2020 VSP projects have been completed, no clear indication of the projects’ timelines were provided. This therefore creates a challenge for the OUR to determine the reliability impact associated with these 2020 VSP projects. Additionally, it appears that there is some level of discrepancy in JPS’s reporting of the 2020 VSP capital projects status. In one instance (Table 2-7, Page 49 of JPS 2021 Annual Review Filing), JPS claims that the 2020 VSP projects have been completed. However, elsewhere in the Filing (page 75), the company indicates that it spent US\$2.0M in 2020 and completed the upgrade of the UWR 110 and 210 feeders, with works on the Highgate and Blackstonedgedge feeders delayed to 2021 mainly due to impacts of Covid-19 on the project roll-out. This requires clarification from JPS.</p>
<p>PROJECT: Grid Modernization Programme</p> <p>As indicated in the Annual Review Filing, US\$1.65M was approved by the Office to fund JPS’s Grid Modernization Programme in 2020, which encompasses the installation of trip-savers, DA switches, pole mounted reclosers and fault circuit indicators. JPS’s forecasted reliability impact for these capital projects was a reduction in SAIDI of 17.6 minutes/customer, and a decrease in unserved energy of 15.5MWh. However, the company has reported that it was forced to adjust the respective projects implementation schedule due to the effects COVID-19, which impeded the overall progress of the Grid Modernization Programme deployment in 2020. According to JPS, this constraint delayed the completion of some projects, resulting in the under-achievement of forecast reliability improvements for 2020. Further, the company reported that the Grid Modernization projects executed in 2020 yielded reliability improvements, representing a reduction in SAIDI of 5.87 minutes/customer (based on measurements for the period 2020 December to 2021 March), and projects that the full reduction 17.6 minutes/customer initially forecast will be achieved by the end of 2021. However, based on the OUR’s assessment, the reduction in SAIDI reported for 2020 December – 2021 March period, may not be totally attributable to projects executed as part of the Grid Modernization Programme. This suggests that the delayed 2020 reliability improvements, which are being realized in 2021, may fall below expectation, and when combined with the impact resulting from the execution of the 2021 projects, the composite effect could be further diminished. This issue requires further evaluation by JPS.</p>
<p>PROJECT: Distribution Structural Integrity</p> <p>In the 2019-2024 Determination Notice, the Office approved JPS’s proposed CAPEX of US\$4.489M for its 2020 Distribution Line Structural Integrity projects, with scope of works including the replacement of deteriorated distribution poles, rehabilitation of decaying poles, and the replacement of a number of insulators and switches. However, in the 2021 Annual Review Filing JPS indicated that the capital expenditure in 2020 was approximately US\$5.1M, which is US\$0.611M (13.6%) above the approved CAPEX. This is a significant deviation from the allowed cost, which will require further review. According to JPS, the excess expenditure was due to an increase in the scale of the programme executed in 2020, to shore up distribution structures as Jamaica was exposed to a number of tropical storms during the year, but no specific details were provided. Notwithstanding, this is considered a significant deviation from the allowed cost, which will require further review, considering that the cost of bolstering of the distribution infrastructure against annual storm threats should be captured under the company’s recurring annual maintenance cost approved by the Office. Further, it is important to underscore that capital costs for assets entered into the JPS Fixed Asset Register that were not approved by the Office and determined to be not prudent, will not be allowed. With respect to the reliability impact of the 2020 Distribution Line Structural Integrity projects, JPS forecast a reduction in SAIDI of 11.284 minutes/customer. However, no indication of any actual SAIDI improvement from these projects was provided by JPS.</p>
<p>PROJECT: Distribution Line Re-Conductoring and Relocation</p> <p>A total CAPEX of US\$1.314M was approved by the Office to support JPS’s 2020 Distribution line Re-Conductoring and Relocation projects, encompassing the rehabilitation of aged primary line sections (13km), installation of 2/0 AA MV covered conductors (228km), rehabilitation of 129 secondary circuits, and commencement works for reconstruction of 15km of line section along the Hope 410 feeder. JPS reported, however, that works executed during 2020 under this programme were significantly reduced, with only 15km of covered conductors installed, and only 15 circuits rehabilitated, all at a cost of US\$0.26M. JPS purported that this project was impacted by the COVID-19 pandemic, with the scope and budget not executed in 2020 being shifted to 2021, to be completed along with the previously approved 2021 scope. In its 2019-2024 Rate Review Application, JPS’s forecast reliability impact of the 2020 Distribution Line Re-Conductoring and Relocation projects would be a reduction in SAIDI of 16.915 minutes/customer. However, given the reported implementation status, the expected reliability benefits for 2020 will not be realized due to the rescheduled completion of the projects to 2021.</p>

OUR COMMENTS/ISSUES ON JPS's 2020 RELIABILITY PROJECTS
PROJECT: Distribution Transformer Replacement/Upgrade Projects
The Approved CAPEX for JPS's 2020 Distribution Transformer Replacement/Upgrade Programme (works at the Tredegar, Rose Hall and Parnassus substations) was US\$2.798M. However, in the 2021 Annual Review Filing JPS indicated that the capital expenditure in 2020 was approximately US\$1.5M, which is US\$1.298M (46.3%) below the approved CAPEX. As reported by JPS in the 2021 Annual Review Filing, the scope of works at the Rose Hall substation were completed in 2020, while the works at the Tredegar substation were partially completed, with those planned for the Parnassus substation deferred to 2021. As with several other capital projects planned for 2020, JPS indicated that the delays in this project were attributable to impacts of the COVID-19 pandemic. It should be noted that, while JPS indicates that 2020 Distribution Transformer Replacement/Upgrade Project was not fully completed, this was contradicted elsewhere in the Filing, where the project was declared as complete.

9.14 OUR's Position

9.14.1. Given that capital expenditure was approved for the 2020 projects, which may not be completed to date, and considering that there was approved capital allocation for the 2021 Grid Modernization projects, the OUR is of the view that it is prudent for JPS to present a strategy involving some degree of recalibration/reconciliation of projects timetable and execution plan to direct the reliability programme back on a normal track, so as to ensure that the established objectives can be achieved within the defined period, despite the apparent challenges.

JPS's Reliability Improvement Projects planned for 2021

9.14.2. In the 2021 Annual Review Filing, JPS indicated that the major reliability projects planned for 2021 are as summarized in Table 9.5 below.

Table 9.5 – JPS's 2021 Reliability Improvement Projects

JPS 2021 RELIABILITY PROJECTS AND ASSOCIATED CAPITAL EXPENDITURE	
Projects	OUR Approved 2021 Capital Expenditure (US\$'000)
Voltage Standardization Programme	3,196
Grid Modernization Programme	2,299
Distribution Structural Integrity	4,564
Distribution Line Re-Conductoring and Relocation	2,124
Transmission Structural Integrity	1,870
Substation Structural Integrity	1,722
TOTAL	15,775

9.14.3. In addition to planned implementation of these major reliability projects, JPS has also indicated that it intends to replace the existing ABB/Ventyx Outage Management System (OMS), commissioned in 2013, which is now fully depreciated. In the 2019-2024 Determination Notice, the Office approved a total CAPEX of US\$2.126M for the replacement of the existing OMS with a new fully integrated OMS solution to be implemented over the 2020-2021 timeframe, with capital allocations of US\$1.126M and US\$1M for 2020 and 2021 respectively. JPS has provided no indication as to whether the OMS replacement project commenced in 2020, but the company has indicated that it is scheduled for completion in 2021.

9.15 Regulatory Review of JPS's 2020 Quality of Service Performance

Review of JPS's 2020 Annual Outage Dataset

9.15.1. Subject to the Q-Factor requirements in the “Final Criteria” and the relevant conditions of the 2019-2024 Determination Notice, the 2020 Annual Outage Dataset submitted in the 2021 Annual Review Filing was used as the basis for the OUR’s assessment of JPS’s system reliability performance in 2020. This outage dataset was compiled and presented in Microsoft Excel format under the filename “*JPS 2020 OMS Outage Dataset.xlsx*”. It comprises the data captured in JPS’s OMS system, and JPS’s calculations of the 2020 quality indices (SAIFI, SAIDI and CAIDI), and is structured with the following data categories:

1. Annex A - Raw Data (ANNEX A)
2. Annex B - Calibrated Dataset (ANNEX B)
3. Annex C - Summary Table (ANNEX C)
4. Annex D - 2016-2020 Trend (ANNEX D)
5. Annex E – Outage Drivers 2020 (ANNEX E)

9.15.2. To validate JPS’s reported system reliability measurements/indicators, the OUR conducted initial review of the system outage dataset to identify errors, omissions, or misrepresentations in the underlying data and reliability calculations, as well as to determine the scope and scale of any adjustments made by JPS to the raw outage data prior to the calculation of the reliability indices. This screening exercise entails checks for outages with negative duration, checks for duplicate outage event records, events incorrectly classified as momentary or sustained outage events, among other things. These procedures are executed in a meticulous manner to ascertain the credibility of the outage dataset, as embedded discrepancies or errors can adversely impact the accuracy of reliability metrics and by extension the Q-Factor adjustment.

9.15.3. In the review process, the raw outage data (ANNEX A) and the calibrated dataset (ANNEX B), which contain the full details of the power outages and associated service interruptions during the period 2020 January 1 - December 31, were thoroughly examined, as these data categories contained the core data used by JPS to derive the proposed 2020 quality indices for the Q-Factor mechanism.

9.16 Description of the 2020 Annual Outage Dataset

9.16.1. While the 2020 Annual Outage Dataset encapsulates several components, the main aspects relevant to the Q-Factor were appropriately characterized and summarized as shown in Table 9.6 below.

Table 9.6 - Characterization of JPS’s 2020 System Outages

2020 ANNUAL OUTAGE DATA CHARACTERIZATION										
ANNEX	TOTAL OUTAGE EVENTS (Forced & Planned)	REPORTABLE vs NON-REPORTABLE OUTAGES (Forced & Planned)		OUTAGE EVENTS BY SYSTEM SEGMENT			MOMENTARY vs SUSTAINED		FORCED vs PLANNED	
		Reportable	Non-Reportable	Gen.	Trans.	Dist.	Mom.	Sust.	Forced	Planned
A	63,217	60,022	3,195	1,065	221	61,931	4,641	58,576	60,764	2,453
B	63,217	60,022	3,195	1,065	221	61,931	4,650	58,567	60,764	2,453
ANNEX	RANGE OF CUSTOMERS AFFECTED DURING OUTAGE EVENTS		OUTAGE DURATIONS (minutes)			RANGE OF CUSTOMER MINUTES LOST				
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum				
A	1	48,259	0.02	150,025.57	0.02	66,827,575.20				
B	1	48,259	0.02	150,025.57	0.02	32,866,651.35				

9.17 Review of JPS’s Adjustments to the Outage Dataset

9.17.1. The OUR’s review of the 2020 outage dataset (ANNEX A and ANNEX B) identified no material errors in the data records. However, it was found that JPS effected some level of calibration/adjustment to the dataset, resulting in the differences between the raw outage dataset (ANNEX A) and the calibrated dataset (ANNEX B), and the determination of the total number of forced outages categorized as “Non-Reportable”.

Adjustment/Calibration of Raw Outage Data by JPS

9.17.2. As with previous reliability performance measurements, JPS derived the 2020 quality indices (see Table 9.2 above) from the calibrated 2020 outage dataset (ANNEX B) and not the raw OMS outage data (ANNEX A). This is due to the application of data calibration/normalization procedures (“Rules Based Data Dictionary”) to exclude some recorded outage events linked to factors such as abnormal system operating conditions, non-utility related outages, erroneous customer-to-device mapping, and gaps in outage data records caused by OMS/GIS interface dysfunction.

9.17.3. The OUR’s review of JPS’s calibrated 2020 outage dataset, revealed the following:

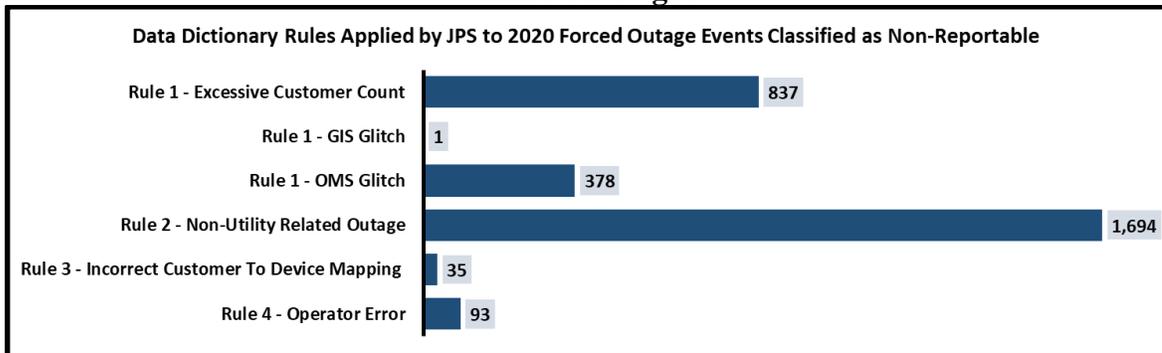
- a. Inclusion of additional information for each outage record contained in the calibrated outage dataset (ANNEX B); and
- b. Amendments to the outage information for some forced outage events.

9.17.4. As presented by JPS, the calibrated outage dataset contained additional “primary” data elements for each outage record including the name of feeder to which each outage event was assigned, the system customer count, the data calibration rule applied, the primary and secondary cause of each outage; as well as derived data such as the outage event SAIDI and SAIFI. Overall, a total of **5,851** outage events were identified in the calibrated outage dataset with amended data points, which were verified as being calibrated and adjusted by JPS. These amendments primarily include changes to data record involving, outage start and/or restoration times, as well as the number of customers affected, which in some cases lead to other changes such as the outage classification (for example, a momentary interruption transitioning to a sustained outage event).

9.18 Review of JPS’s Non-Reportable Outages

- 9.18.1. As indicated in Table 9.6 above, a total of 3,195 outages recorded by JPS in 2020 were classified as “Non-Reportable” outages, with 3,038 of these being forced outages. Based on system outage reporting rules established by JPS and the OUR, an outage event is designated “Non-Reportable” when certain types of errors are linked to that outage event. Having assessed the increasing trend in JPS’s Non-Reportable Outages and their distortional effects on the Q-Factor during the 2014-2019 regulatory period, the Office in the 2019-2024 Determination Notice, established a limit for Non-Reportable Outages of 5% of total recorded forced outages. Accordingly, outage events classified as “Reportable”, which will account for a minimum of 95% of total forced outages from 2020 going forward, will be the basis for the calculation of the prescribed quality indices. In that regard, the 2020 forced outages designated as “Non-Reportable” by JPS were subjected to a thorough evaluation by the OUR, which confirmed the veracity of the 3,038 Non-Reportable outages, thereby satisfying the stipulated tolerance of 5%, and representing a significant improvement relative to the 2019 outcome.
- 9.18.2. In summary, the OUR’s review found that the 3,038 Non-Reportable forced outages (excluded from the 2020 outage data used for reliability performance measurement), were classified in accordance with the “Rules Based Data Dictionary” and disaggregated as shown in Figure 9.2 below.

Figure 9.2 - JPS’s Classification and Disaggregation of the 2020 Non-Reportable Forced Outages



- 9.18.3. As illustrated, 1,822 outage events were classified by JPS as “Non-Reportable” based on the application of Rules 2, 3 and 4, which was viewed as not unreasonable. However, the application of Rule 1 to classify 1,216 outages as “Non-Reportable” is questionable on the basis that the requirements for Rule 1 of the “Rules Based Data Dictionary” do not provide for the classification of an outage as “Non-Reportable”. As such, this will require explanation from JPS.

Non-Utility Related Outages

- 9.18.4. As reflected in the data, “Non-Utility Related Outages” (Rule 2) was the most influential factor driving the Non-Reportable outages in the 2020 reliability data, accounting for

(56%) of the causes. According to the Rules Based Data Dictionary, at times JPS is unable to immediately resolve these Non-Utility Related Outages, mainly due to circumstances such as customers' premises being found locked and outage cannot be verified, premises not found, defective customer equipment and, service disconnection. However, with the implementation of the grid modernization programme, large-scale deployment of advanced metering systems, and the full integration of the OMS/Geographic Information System (GIS)/Customer Information System (CIS) platforms, it is expected that during the remaining portion of the review period, JPS will have improved capabilities to more effectively respond to these outages.

Summary Comments

9.18.5. Based on the OUR's assessment, no need was identified for any additional adjustment to the 2020 outage dataset beyond those performed by JPS. Therefore, considering the level of Non-Reportable outages filtered from the 2020 dataset, it can be inferred that within the established limits, the number of "Reportable Outages" are deemed reasonable for the computation of the prescribed quality indices for the 2020 Q-Factor.

9.19 Evaluation of 2020 Forced Outage Data

9.19.1. In order to verify JPS's 2020 quality indices, the OUR performed its own reliability calculations using the "Reportable forced outages" (57,726) shown in the 2020 forced outages breakdown provided in Table 9.7 below.

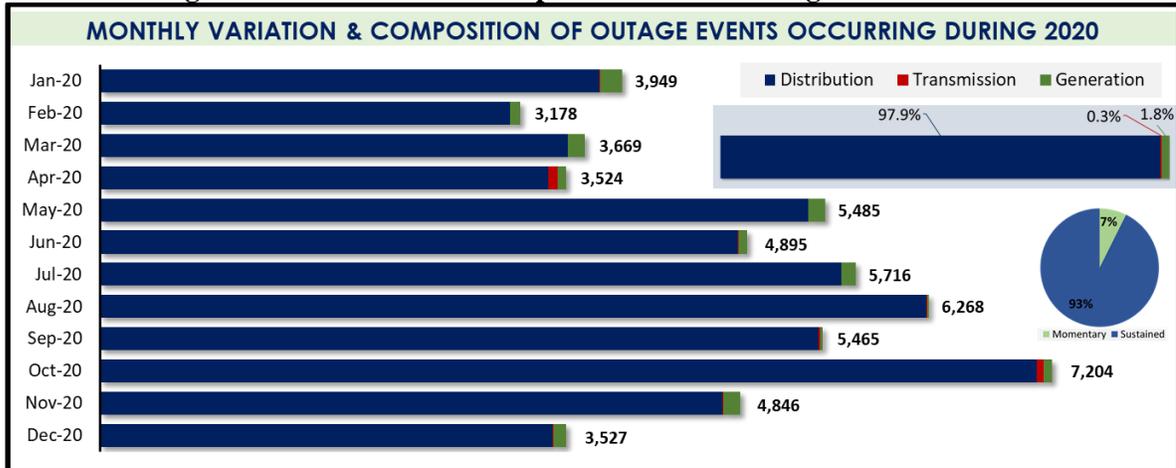
Table 9.7 - 2020 System Outages Breakdown

CATEGORIZATION OF THE 2020 SYTEM FORCED OUTAGE DATA								
TOTAL SYSTEM OUTAGES (Forced & Planned)			SYSTEM FORCED OUTAGES (Momentary & Sustained)			PLANNED OUTAGES		
Total	Forced	Planned	Total	Momentary	Sustained	Total	Momentary	Sustained
63,217	60,764	2,453	60,764	4,359	56,405	3,195	291	2,162
BREAKDOWN OF 2020 FORCED OUTAGES								
SYSTEM FORCED OUTAGES			SUSTAINED FORCED OUTAGES			MOMENTARY FORCED OUTAGES		
Total	Reportable	Non-Reportable	Total	Reportable	Non-Reportable	Total	Reportable	Non-Reportable
60,764	57,726	3,038	56,405	53,463	2,942	4,359	4,263	96

9.20 Analysis of Forced Outage Data

9.20.1. After excluding the 2020 Non-Reportable outages, the total Reportable forced outages (57,726) were categorized in terms of generation, transmission and distribution outages as shown in Figure 9.3 below.

Figure 9.3 - Distribution of Reportable Forced Outages in 2020



9.20.2. As illustrated, the number of Reportable forced outages recorded for each month in 2020 fluctuated throughout the year, with a maximum of 7,204 events recorded for 2020 October, which is approximately 50% higher than the monthly average (4,811) for the year. According to JPS, the high number of outages in 2020 October was due to the impact of Tropical Storm Zeta, which damaged system infrastructure across the island, leading to a number of power outages.

9.20.3. Regarding the distribution of the total Reportable forced outages across the system; approximately 98% were linked to the distribution network, as expected. This tends to occur because most customers are connected to this part of the system, which is largely an exposed overhead network with inherent vulnerabilities. In contrast, forced outages linked to the transmission network accounted for the lowest proportion at 0.3%. The data shows that in 2020 April, there was a spike in transmission network outages, these according to JPS, were linked to a major transmission incident during the month caused by a bush fire.

Distribution of Sustained and Momentary Forced Outages

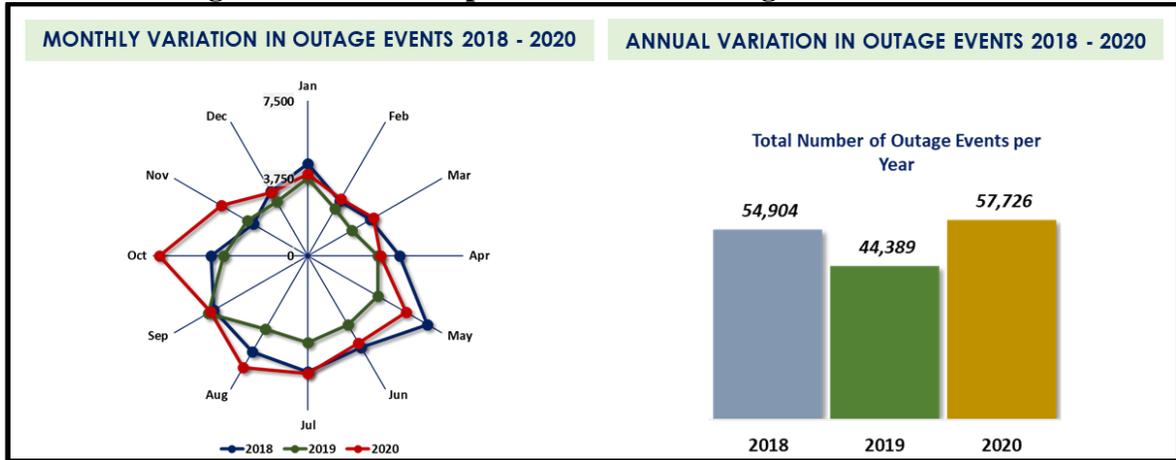
9.20.4. As stipulated in Schedule 3 of the Licence 2016 and the “IEEE Guide for Electric Power Distribution Reliability Indices” (IEEE Std 1366-2012), the pivot point for distinguishing sustained and momentary supply interruptions is 5 minutes of outage duration. For the 2020 outage data, the reported sustained and momentary interruption events share of the total forced outages were 93% and 7%, respectively. Notably, the 2020 sustained/momentary interruption distribution are similar to that of previous annual outage datasets, indicating that the annual distribution of sustained and momentary interruptions have not varied significantly, over time.

Annual Forced Outages Trend

9.20.5. The OUR’s assessment of the 2020 system outage shows that the 2020 Reportable forced outages have increased significantly relative to those recorded for 2019 and 2018 as illustrated in Figure 9.4 below. While JPS contends that storm conditions during the months

of 2020 August, October and November, have contributed to increased outage events in the reporting period, there is no vivid evidence that there was excessive tropical storms activity impacting the electricity system in 2020. Moreover, JPS’s 2019-2024 Rate Review Application highlighted a series of reliability improvement investments made during the 2017-2019 period, to minimize the frequency of system outages going forward. Therefore, it creates cause for concern that the number of forced outages reported for 2020 is higher than that reported for 2018 by 2,822 outages or 5%.

Figure 9.4 - JPS’s Reportable Forced Outages for 2018-2020



9.21 Review of Daily System Customer Count Records

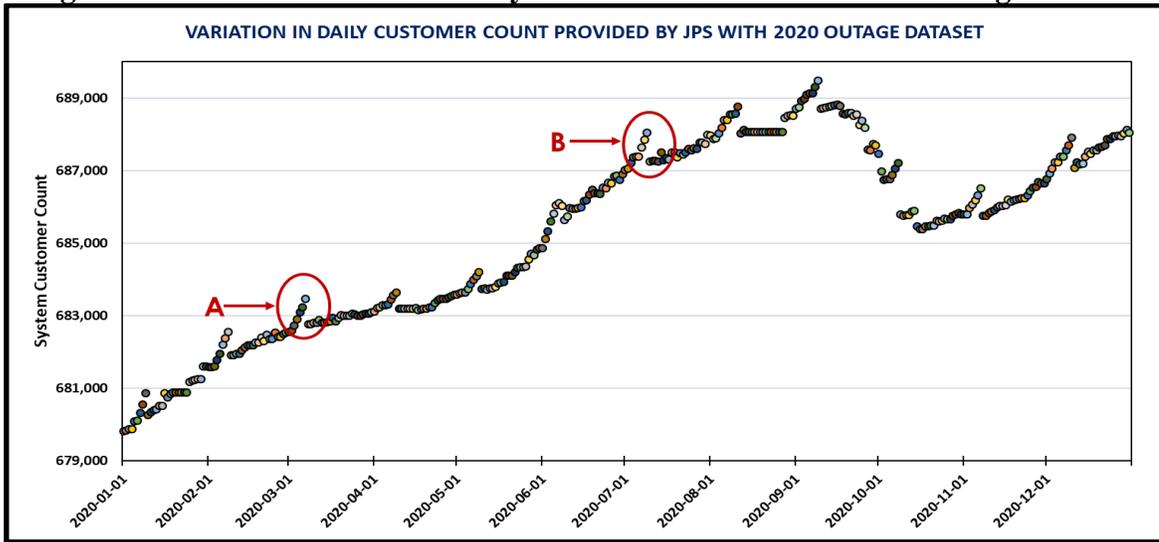
9.21.1. System customer count is an important parameter required for the calculation of the quality indices, and can have a significant influence on the computed values of SAIFI and SAIDI. As such, the accuracy of the customer count data, particularly the “daily customer count”, is critical for ensuring the credibility and plausibility of the reliability calculations. Further, the use of incorrect customer count data will likely lead to inaccurate Q-Factor results, which have financial implications for JPS and rate payers. In that context, JPS, in keeping with the quality of service requirements, should exercise reasonable diligence and take appropriate action to ensure that its customer count data is accurate and reliable.

9.21.2. Based on the outage reporting requirements, for each outage that occurred on the system each year (reported in the relevant Annual Outage Datasets), JPS should include the actual system customer count existing on the day which such outage was initiated. According to JPS, daily system customer counts utilized in its OMS, and which are integral to the compilation of the Annual Outage Datasets are extracted from its CIS on a daily basis. These customer count data reported by JPS includes “Active Accounts” which comprise the following:

- Postpaid accounts with meter advancing and being billed;
- Prepaid accounts; and
- Disconnected/suspended accounts and being billed.

9.21.3. The customer count data also includes “Inactive Accounts” which comprise accounts terminated by customers’ request, temporary accounts, which have expired, and accounts, which have been disconnected/suspended for at least one (1) year, are not included in daily customer count numbers. A plot of the daily system customer count included in the 2020 Annual Outage Dataset is presented in Figure 9.5 below.

Figure 9.5 - Variation in JPS’s Daily Customer Count in the 2020 Outage Dataset



9.21.4. For emphasis, the summary statistics of the daily customer count included in the 2020 outage dataset is presented in Table 9.8 below.

Table 9.8 – JPS’s Daily Customer Count Statistics – 2020 Outage Dataset

JPS’s DAILY CUSTOMER COUNT SUMMARY STATISTICS - 2020 OUTAGE DATA -						
Avg.	Min.	Max.	Avg. Daily Δ	Max. Daily Δ	Count @ 1/1/20	Count @ 31/12/20
685,276	679,810	689,478	98	1,422	679,810	688,047

9.21.5. As demonstrated in Figure 9.5 and Table 9.8 above, the 2020 daily customer count profile shows a general increase from 679,810 customers at the start of the year to a maximum of 689,478 customers in 2020 September, then reversed sharply to 685,371 in 2020 October. Thereafter, the number of customers increased steadily to a total customer count of 688,047 at 2020 December 31. During the period, the maximum single day variation in customer count was 1,422 customers. While there was an overall increase in customer count at the end of the year, there were a number of drastic variations in the customer count data, similar to those indicated at point A and B in Figure 9.5 above, with no specific reasons provided by JPS. Considering these observations, it is important to note that under utility business conditions with incremental additions of customer accounts throughout the year, it would be expected that the system daily customer count time series would exhibit a continuous inclining profile instead of the “discontinuities” depicted in the graph presented in Figure 9.5.

- 9.21.6. These customer count issues were raised with JPS, as part of the OUR’s request for additional information to facilitate the complete review of the 2021 Annual Review Filing.
- 9.21.7. In its response, JPS attempted to describe the process by which the system daily customer count is updated. According to JPS, the addition of new customers to its information systems is an ongoing process with daily, or near daily, updates. However, as it pertains to the change of a customer’s status to “inactive” and the removal of a customer from the customer base, JPS indicates that this process is not always executed in real time. Instead, this process is, at times, done in aggregate, and executed manually either at mid-month intervals or closer to the end of the month. According to JPS, this procedure tends to result in the daily customer count variations exhibited in Figure 9.5 above. Further, JPS indicated that the overall reduction in customer count figures observed in the 2020 September to October timeframe was a result of audits performed on accounts with multiple estimates. According to JPS, the audits detected over 3,000 accounts, with no transactional activity and were eventually declared “inactive”. JPS indicated that this outcome significantly reduced the daily customer count during the stated period.
- 9.21.8. It is understandable that daily variations in the system customer count is an intrinsic feature of JPS’s commercial operations due to the dynamics involved, and certain exceptional circumstances could potentially constrain the company in updating its daily customer count in real time occasionally. However, the approach (not real time) being used by JPS to update system customer count appears to be inherently mechanical and likely susceptible to systemic errors, which would account for the prevailing customer count issues, including major inconsistencies across various datasets and regulatory reports submitted by the company. On this issue, the OUR is of the view that given the advanced capabilities of the existing CIS and other information management platforms available to JPS, this customer count situation should not exist. Therefore, in light of these factors, the company should seek to employ reasonable efforts to urgently resolve this embedded problem.
- 9.21.9. Additionally, it is important to note that the high level of variation and inconsistencies in the customer count data across JPS’s datasets create uncertainty in relation to the accuracy of this parameter, particularly for its application in the calculation of the quality indices required for Q-Factor adjustment, which has financial implications. Accordingly, JPS should ensure that the reported customer count data are appropriately verified and reconciled across datasets/regulatory reports on a continuous basis.

9.22 Treatment of IPP Outages in the Reliability Calculations

- 9.22.1. Based on the established Q-Factor, JPS shall not be penalized under the Q-Factor mechanism for IPP generation outages, unless the cause of such outages is due to fault on the part of JPS. As such, all IPP-related forced outages included in the 2020 annual outage dataset were excluded from Reportable outages used to calculate the 2020 quality indices. A breakdown of the IPP-related outages is provided in Table 9.9 below.

Table 9.9 - Breakdown of 2020 IPP-Related Outages

CLASSIFICATION OF 2020 IPP OUTAGE EVENTS					
REPORTABLE/NON-REPORTABLE		CATEGORIZATION OF REPORTABLE “IPP OUTAGE” EVENTS			
Reportable	Non-Reportable	Generation	Transmission	Distribution	Aggregate

		Mom.	Sust.	Mom.	Sust.	Mom.	Sust.	Mom.	Sust.	Total
884	7	225	659	0	0	0	0	225	659	884

9.23 OUR's Derivation of the 2020 Quality Indices

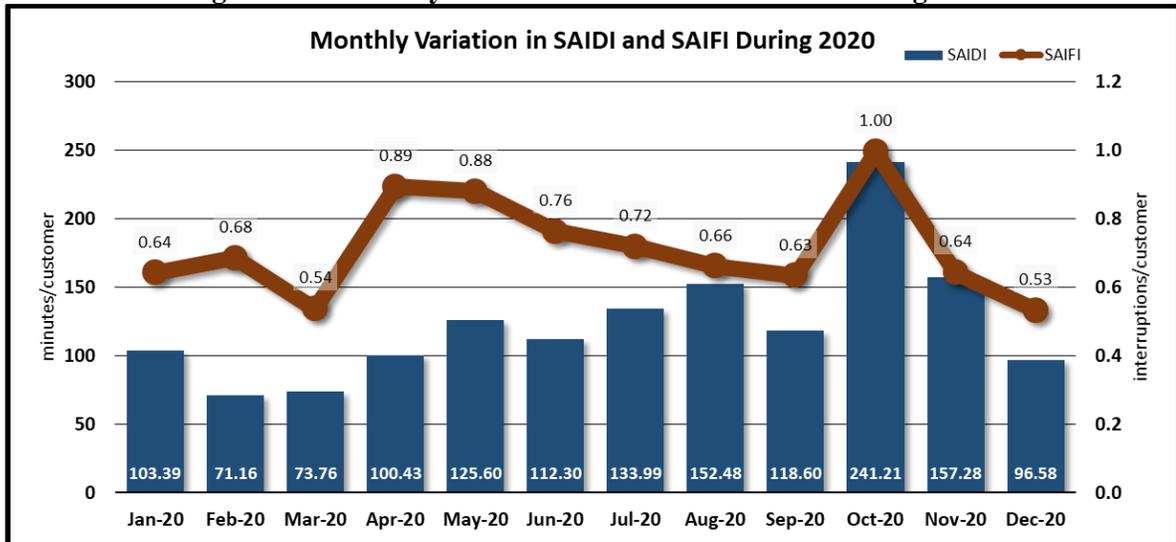
9.23.1. Using the applicable outage data inputs (number and duration of interruptions from Reportable outages and associated customer count) provided in the calibrated 2020 outage dataset), the OUR computed the 2020 quality indices, which are presented in Table 9.10 below.

Table 9.10 - OURDetermined Quality Indices for 2020

2020 QUALITY INDICES CALCULATED BY OUR AND JPS				
INDICATOR	UNIT	JPS CALCULATED INDICES	OUR CALCULATED INDICES	PERCENTAGE DEVIATION
SAIDI	minutes/customer	1,486.767	1,486.767	0%
SAIFI	interruptions/customer	8.582	8.582	0%
CAIDI	minutes/interruption	173.237	173.237	0%
MAIFI	interruptions/customer	13.777	13.777	0%

9.23.2. As shown, the 2020 values for SAIFI, SAIDI, and CAIDI calculated by the OUR, were identical to those computed by JPS. This indicates convergence and validates the reliability measurements presented by JPS. Accordingly, the 2020 SAIFI, SAIDI, and CAIDI values derived by the OUR were used to determine the 2020 Q-Factor for application to the 2021 PBRM. A more granular view of the system reliability performance in 2020 is presented in terms of monthly SAIDI and SAIFI indicators, as illustrated in Figure 9.6 below.

Figure 9.6 - Monthly Variation in SAIDI and SAIFI During 2020



9.24 OUR's Determination of the 2020 Q-Factor

9.24.1. To determine the 2020 Q-Factor, the established 2020 targets for SAIDI, SAIFI and CAIDI presented in Table 9.10 above, together with the OUR's calculated 2020 SAIFI, SAIDI and CAIDI values were applied to the Q-Factor mechanism defined under Schedule 3 (Exhibit 1) of the Licence 2016 (described in Figure 9.1 above). The mechanics of this process

involves the application of the defined “quality points scoring system” to the performance of SAIFI, SAIDI and CAIDI against the applicable targets, to generate “cumulative quality points scores” from a specified range, which are used to determine the Q-Factor level (see Figure 9.7 below).

Figure 9.7 - Quality of Service Performance Criteria and Quality Points System

Exhibit 1, Schedule 3 of JPS 2016 Electricity Licence	
Until revision by the Office the quality of service performance should be classified into three categories, with the following point system:	
<ul style="list-style-type: none"> • 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 quality points for:	
<ul style="list-style-type: none"> • 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% 	

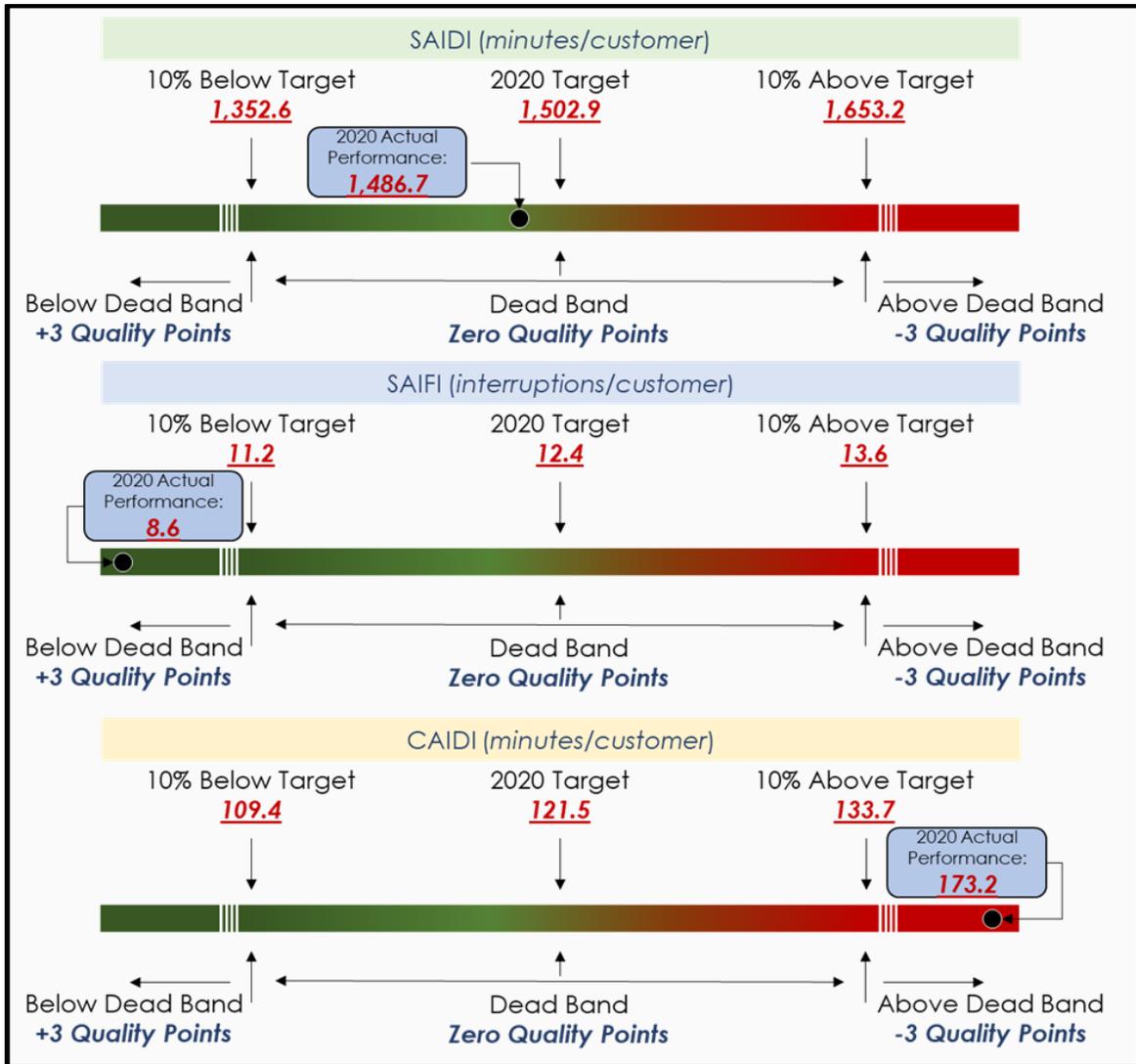
9.24.2. Following the described process, this model was executed by the OUR to determine the 2020 Q-Factor as demonstrated in Table 9.11 below.

Table 9.11 - Measurement of JPS’s 2020 Quality of Service Performance and Determination of Q-Factor

MEASUREMENT OF QUALITY OF SERVICE AND DETERMINATION OF Q-FACTOR FOR 2020						
QUALITY INDICES	2020 TARGET	10% BELOW TARGET	10% ABOVE TARGET	2020 ACTUAL PERFORMANCE	% DIFFERENCE WRT TARGET	QUALITY POINTS
SAIDI (minutes/customer)	1,502.9	1,352.6	1,653.2	1,486.7	-1% (within ±10% - dead band)	0
SAIFI (interruption/customer)	12.4	11.2	13.6	8.6	-31% (greater than 10% below target)	+3
CAIDI (minutes/interruption)	121.5	109.4	133.7	173.2	43% (greater than 10% above target)	-3
TOTAL QUALITY POINTS:						0
Q-FACTOR ADJUSTMENT:						0.00%

9.24.3. Further illustration of the workings of quality points system and the Q-Factor is provided in Figure 9.8 below.

Figure 9.8 - Illustration of 2020 SAIDI, SAIFI and CAIDI Performance



9.24.4. As indicated in Table 9.11 and Figure 9.8, the quality points attributable to SAIDI, SAIFI and CAIDI, based on JPS’s 2020 quality of service performance, are **0**, **+3**, & **-3** respectively, which sums to zero (0). Based on the defined “quality points scoring system”, for a cumulative score of zero (0), **Q = 0.00%** (see Figure 9.7). This means that the 2020 Q-Factor is **0.00%**, which is the value that will be applied to the 2021 PBRM.

9.25 Variation in Reliability Performance Across the Power System

9.25.1. In electricity systems reliability performance measurement applications, a shortcoming of the Q-Factor mechanisms using the SAIFI, SAIDI and CAIDI metrics is that they measure

average system-wide reliability performance, and does not necessarily convey discrete information for the various service areas/regions served by the system. However, in many power system operations, there tends to be a wide variation in reliability experience across service areas, which is often due to the geographical orientation of the service territory, and the configuration of the power system, among other factors.

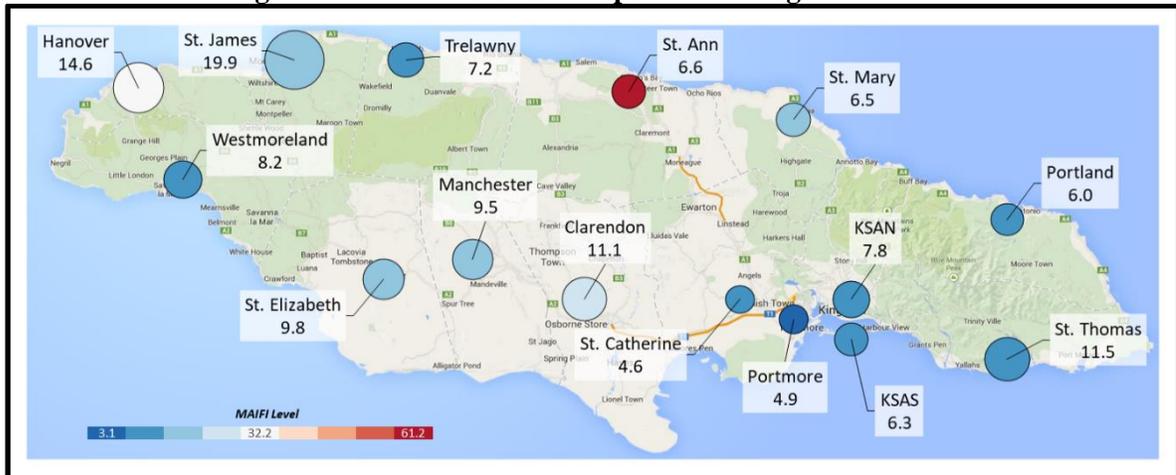
9.25.2. In the case of JPS’s electricity system, the historical outage has shown a wide variation in reliability performance across service areas, with some areas, especially rural areas, experiencing extremely poor service reliability as exhibited by the reliability metrics. The 2020 outage data shows a similar pattern. The annual outage datasets provided by JPS, includes locational data for each outage event, which includes the parish and the specific feeder associated with the outage event. This allowed the OUR to assess the reliability performance across the different parishes and major service areas of the country, as well as the reliability across distribution feeders. This assessment links outage to parish/service area and estimates the corresponding level of service reliability in each parish/service area using the reliability indices. For 2020, the number of outages, and the corresponding SAIDI for each parish/major service area across the island, were determined and distributed as illustrated in Figure 9.9 below.

Figure 9.9 - Number of Outages and Estimated SAIDI per Parish/Region for 2020



9.25.3. Similar to SAIDI, the corresponding values of SAIFI (estimated) distributed across each parish/major service area are shown in Figure 9.10 below.

Figure 9.10 - Estimated SAIFI per Parish/Region for 2020



- 9.25.4. As demonstrated in Figures 9.9 and 9.10 above, JPS customers across the island experienced significant variation in electricity service reliability during 2020. The data shows that on average, customers in the parishes of Hanover and St. James, for example, experienced over four (4) times the outage duration as those in the KSAN region, and over five (5) times those in Portland. Customers in St. James also experienced very high frequency of sustained outages, with those in St. Ann experiencing a relatively high number of momentary outages. It is very noticeable that for the parishes of Clarendon, St. Thomas, Hanover and St. James, the respective SAIDI and SAIFI performances were considerably worse than those reported for the entire system.
- 9.25.5. Based on these indications, JPS should recognize that while the overall system reliability performance indicators have shown some improvements over the years, the reliability in some service areas continues to be very poor and below acceptable standards. In that regard, the company needs to take urgent action to address these cases of undesirable service quality.
- 9.25.6. As indicated previously, the 2020 outage data was also assessed to identify the feeders with the highest and least number of Reportable forced outages. This assessment found that 57,726 Reportable forced outages that impacted the entire system in 2020 were associated with a total of 114 distribution feeders. Based on the screening process, the ten (10) worst performing feeders in terms of highest number of forced outages and the ten (10) best performing feeders, in terms of lowest number of forced outages were identified as listed in Table 9.12 below.

Table 9.12 - Feeders with Highest & Lowest Number of Reportable Forced Outages in 2020

FEEDERS ASSOCIATED WITH HIGHEST & LOWEST NUMBER OF REPORTABLE FORCED OUTAGES IN 2020									
HIGHEST NUMBER OF REPORTABLE OUTAGES				LOWEST NUMBER OF FORCED OUTAGES					
#	Feeder	Momentary Outages	Sustained Outages	Total Outages	#	Feeder	Momentary Outages	Sustained Outages	Total Outages
1	Maggotty 210	66	2,186	2,252	1	Hunts Bay 510	1	-	1
2	Bogue 310	97	2,132	2,229	2	Monymusk 310	4	-	4
3	Constant Spring 410	97	2,064	2,161	3	Hunts Bay 610	-	4	4
4	Orange Bay 310	113	1,910	2,023	4	Queens Drive 610	1	4	5
5	Bogue 610	64	1,705	1,769	5	Rockfort 310	6	2	8
6	May Pen 110	93	1,667	1,760	6	Queens Drive 510	4	4	8
7	Cardiff Hall 310	180	1,453	1,633	7	Hunts Bay 110	3	11	14
8	Spur Tree 310	87	1,514	1,601	8	Three Miles 310	9	18	27
9	Spur Tree 210	154	1,440	1,594	9	Maggotty 110	3	29	32
10	Queens Drive 710	139	1,378	1,517	10	Twickenham 410	13	21	34

9.25.7. As indicated, the ten worst performing feeders in 2020, accounted for 18,539 (32%) of the total number of Reportable forced outages (57,726). It should be noted that five (5) of these ten worst performing feeders (highlighted yellow) have had this designation since 2016. In contrast, the ten feeders with the least number of outages accounted for just 137 (less than a percentage point), of the total 2020 Reportable forced outages.

9.25.8. Without question, the obvious disparity with the worst and best performing feeders provides further insight into the uneven service reliability across the system, since these feeders supply most of the areas experiencing very low reliability levels and those with satisfactory reliability respectively. In view of this reliability situation, and taking into consideration the reliability issues raised above, the OUR urges JPS to take urgent action to improve the ongoing poor performance of the identified feeders.

9.26 Outage Causation

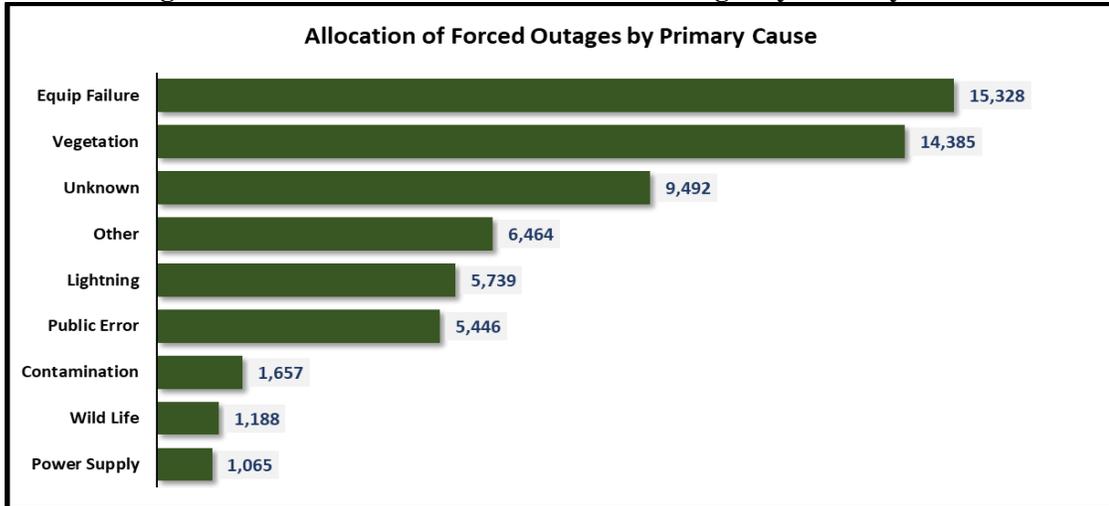
9.26.1. In the 2019-2024 Determination Notice, the Office determined that going forward, JPS shall include specific outage causation information for each outage occurring on the system during each year, to facilitate the annual quality of service assessment and the determination of the Q-Factor. In keeping with this requirement, each outage reported by JPS in the 2020 annual outage dataset was linked to a primary and secondary cause, with a total of nine primary causes for forced outages, and a total of 59 secondary causes reported. These outage causes are presented in Figure 9.11 below.

Figure 9.11 – JPS’s Reported Outage Causes - 2020 Forced Outages

1. Contamination <ul style="list-style-type: none"> Contamination 	<ul style="list-style-type: none"> MOD Other 	<ul style="list-style-type: none"> Incorrect Procedure Non-Standard Design 	<ul style="list-style-type: none"> Disconnection Falling Object 	<ul style="list-style-type: none"> JPS Tree Growing Into Line
2. Equipment Failure <ul style="list-style-type: none"> Breaker Bus Bar Capacitor Conductor Connector Crossarm CT Guy Wire Insulator Joint Jumper Lightning Arrester 	<ul style="list-style-type: none"> Pole Pole Top Pin Protection Device PT RAMI Failure Recloser Relay Shield Wire Substation Structure Switch Transformer 	<ul style="list-style-type: none"> Premises Found OK Premises Locked Premises Not Found RAMI Installation RELI Programme Sabotage Vandalism Work Permit Overreach 	<ul style="list-style-type: none"> Fire (Not Originating from Company Equipment) Illegal Connection Kite Vegetation Vehicle Accident 	9. Wildlife <ul style="list-style-type: none"> Bird Cat Lizard Other Rat
	3. Lightning <ul style="list-style-type: none"> Lightning 	5. Power Supply <ul style="list-style-type: none"> Generation Shortfall 	7. Unknown <ul style="list-style-type: none"> Not Determined 	
	4. Other <ul style="list-style-type: none"> Circuit Loading 	6. Public Error <ul style="list-style-type: none"> Cane Burning Defective Customer Equipment 	8. Vegetation <ul style="list-style-type: none"> Natural Cause Public Fault Tree Cut On Line – Contractor Tree Cut On Line – 	

9.26.2. With respect to the primary causes, the distribution of Reportable and Non-Reportable forced outages by cause is presented in Figure 9.12 below.

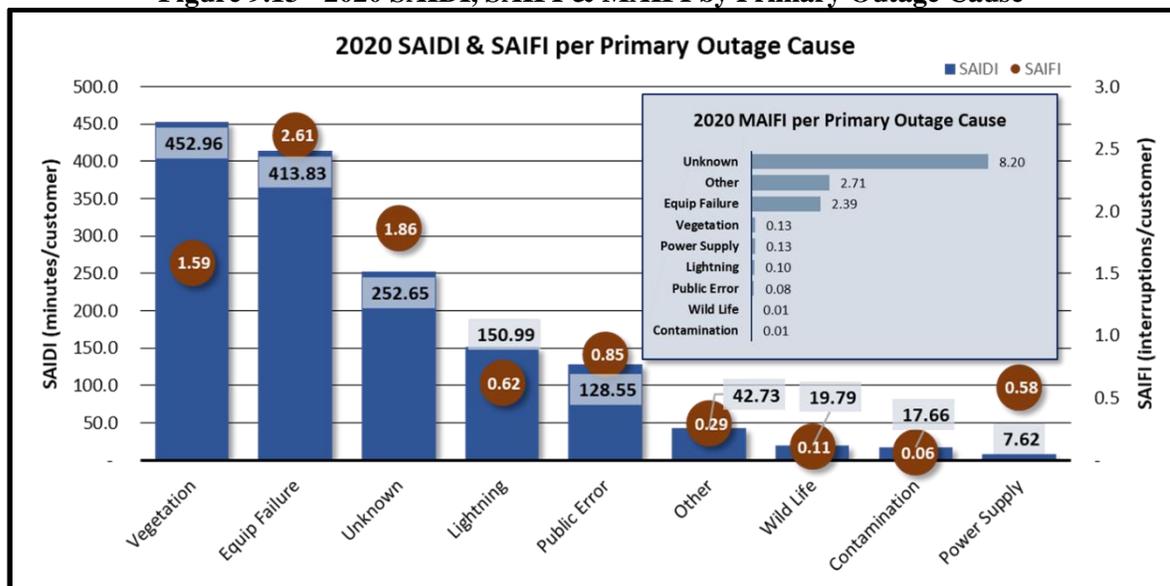
Figure 9.12 - Distribution of 2020 Forced Outages by Primary Cause



9.26.3. As indicated in Figure 9.12, the dominant causes of forced outages in 2020 were equipment failure and vegetation impingement. In analysing the 2020 SAIDI and SAIFI by primary outage cause, it turns out that vegetation and equipment failures also account for the larger proportion (aggregate of 866.79 minutes/customer – 58%) of total SAIDI for the system (1,486.767 minutes/customer), as shown in Figure 9.13 below. For SAIFI, equipment failure was the dominant factor (2.61 interruptions/customer).

9.26.4. In the 2021 Annual Adjustment Filing, JPS indicated that the outages associated with equipment failure was largely due to the impact of three tropical storms impacting the island during the year. The company further indicated that its Structural Integrity Programme should address some of these equipment failure issues.

Figure 9.13 - 2020 SAIDI, SAIFI & MAIFI by Primary Outage Cause



9.26.5. The analysis also identified a significant number (9,462) of forced outages with causes defined by JPS as “unknown”. As shown in Figure 9.13 above, these “unknown” outage causes had significant contributions to overall SAIDI and SAIFI for the system, and was the dominant contributor to MAIFI.

9.26.6. As was the case with the 2018 and 2019 outage datasets, outages with “unknown” causes accounted for approximately 15.6% of total forced outages. In the 2021 Annual Review Filing, JPS acknowledges OUR’s previously expressed concern about the high percentage of outages with an unknown cause. The company indicated that efforts were being intensified to better identify the cause of these outages, but did not provide any specific details. Notwithstanding, since the number and duration of the service interruptions resulting from these forced outages (unknown cause) are considerable, this issue requires urgent attention and further investigation by JPS.

9.27 Treatment of Other Reliability Indicators

MAIFI Related Data

9.27.1. Although MAIFI is not a part of the Q-Factor adjustment mechanism, JPS is required to record momentary interruptions in electricity supply to customers and report them to the OUR on an on-going basis. As part of the JPS reliability performance assessment, momentary disruptions are also analysed and the MAIFI index is also calculated for regulatory monitoring purposes. MAIFI calculated for 2018, 2019 and 2020 are presented in Table 9.13 below.

Table 9.13 – JPS’s System MAIFI Performance (2018-2020)

2018-2020 MAIFI PERFORMANCE	
Year	interruptions/customer
2018	21.667
2019	7.608
2020	13.777

Major System Failures

9.27.2. In reviewing the 2020 outage data, the OUR identified **321** forced outages that satisfied the criteria laid out in the Electricity Act, 2015 for a major system failure. Regarding the legal designation of these outages, JPS in the 2021 Annual Review Filing argued that the Electricity Act's definition for a major system failure is far more restrictive than that used in other jurisdictions, and has suggested that it be changed.

9.28 Findings and Issues from OUR's Q-Factor Review

9.28.1. Findings and issues resulting from the review of the 2020 annual outage dataset and JPS's Q-Factor proposals during this 2021-2022 Annual Review process are discussed below;

1. Consistent with previous Annual Outage Datasets, system daily customer counts were appropriately utilized by JPS in its 2020 reliability data and calculations, as required by the regulatory reporting requirements. However, the OUR continues to identify shortcomings with JPS's methodology used for determining daily customer counts. These include inconsistent and manual updating of some customer count inputs, which introduce obvious errors into the daily customer count data. This situation needs to be addressed by JPS. Additionally, as highlighted in a number of previous tariff determinations, there continues to be inconsistencies with customer count data across various datasets or regulatory reports submitted by JPS. This situation needs to be addressed by JPS, as customer count is an important variable that is integral to a wide range of utility metrics, including the prescribed quality indices, system losses, etc.
2. According to the Licence 2016, the Q-Factor is based on the average reliability performance across the entire system. Furthermore, as electricity rates do not depend on customer location, it would be reasonable for customers connected to the system to expect similar levels of service, regardless of location. However, OUR's Q-Factor analysis on the 2020 outage dataset, as well as previous outage datasets, has revealed significant disparities in reliability performance across different parts of the network. This is evident when comparing across parishes/major service areas, and when identifying the number of outages occurring on each feeder. While it is recognized that the characteristics of each feeder can vary considerably, a number of feeders exhibit consistently poor performance, in terms of number of outages, from year to year. This suggests that additional efforts placed in improving reliability on these feeders could have a significant impact in improving reliability indices, and reducing the disparities in service to customers, regardless of location on the network. Greater effort is therefore required on the part of JPS to ensure greater consistency in the delivery of electricity service to its customers, in accordance with the requirements of the Licence 2016 and the Electricity Act, 2015.
3. The OUR's analysis of JPS's report of outage causes revealed that a significant percentage of outages were attributed to "unknown causes". In that regard, JPS needs to take urgent action to investigate and more precisely identify the cause of forced outages, since it becomes increasingly difficult to limit the potential of recurrence if the cause of an outage is unknown.
4. Approximately 38% of outages classified as Non-Reportable outages in the 2020 outage dataset were so determined after the application of Rule 1 of JPS's Rules Based

- Data Dictionary. However, the possible actions provided by JPS for the conditions triggering Rule 1 do not include classifying an outage as “Non-Reportable”. As such, JPS needs to provide clarification/explanation, as to why these outage events were classified in this manner, or the company may need to consider amending the Rules Based Data Dictionary to appropriately capture all possible actions to take when a rule is applied.
5. As highlighted in previous OUR assessments of JPS’s outage data, there continues to be major discrepancies between outage data reported in JPS’s outage dataset, and system outage data included in other regulatory reports submitted to the OUR. JPS should recognize that these disparities could create uncertainties regarding the quality and credibility of its reported outage data. In that regard, JPS should ensure that there is consistency in reported outage data through proper validation, and in cases where there are unavoidable deviations, appropriate reasons should be provided.
 6. Section 45 (16) of the EA, defines a “major system failure” as a system failure that (i) has not been planned by the System Operator; (ii) affects at least one thousand customers; and (iii) lasts at least two hours. Based on this threshold, the OUR’s review identified 321 outages in the 2020 annual outage dataset that would qualify as a “major system failure”. Under the said section 45 of the EA, there are stipulated obligations of the System Operator when a major system failure occurs. However, the OUR acknowledges that the threshold for identifying an outage as a “major system failure” is relatively low, considering the subsequent actions required by the EA. In that regard, the OUR will collaborate with JPS on this issue, where possible, to facilitate normalization.
 7. The Office approved a number of capital projects aimed at improving system reliability in the 2019-2024 Determination Notice, with a total capital expenditure of US\$17.12M for 2020. JPS in the 2021 Annual Review Filing indicated variations in some instances, both in expenditure and scheduling, provided updates. There were contradictions, however, throughout the submission, with respect to both expenditure and scheduling for some projects. JPS needs to provide clarification/explanation. Additionally, the measured reliability impact was provided for some projects, but this was not provided for the full listing of reliability improvement projects.
 8. Capital expenditure was also approved in the 2019-2024 Determination Notice for the replacement of JPS’s existing OMS, scheduled for implementation during the 2020-2021 timeframe. However, JPS provided no specific information on the status of this project. A progress report on this project is therefore required from the company.
- 9.28.2. The OUR’s review of the 2020 Annual Outage Dataset revealed that the accuracy of JPS’s outage data recording continues to improve, and the company plans to realize further improvements in outage data quality going forward. However, as outlined above, there are still lingering issues that need to be permanently resolved by the company.

9.29 The OUR's Determination on JPS Q-Factor

9.29.1. In making its determination on JPS's 2020 Q-Factor, the Office took into consideration, among other things, the following:

- The results of the OUR's 2020 Q-Factor evaluation;
- The relevant provisions of the Licence 2016; and
- The Q-Factor determinations set out in the 2019-2024 Determination Notice.

9.29.2. Accordingly, the Office determines that the 2020 Q-Factor applicable to the 2021 PBRM for the 2021-2022 rate adjustment period is zero percent (0.00%).

Determination 15

The Q-Factor to be applied to the 2021 PBRM is 0.00%.

ANNEXES

ANNEX 2 - Estimated Bill Impact of OUR's Approved Annual Tariff Adjustment

2.1 Bill Comparison for a Typical Rate 10 Consumer with consumption < 100 kW

Usage 90 kWh

Rate 10	July Bill-Before			July Bill-After		Bill Impact	
Below 100 kWh	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
90		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
ENERGY							
Energy 1st	90	7.24	\$ 651.20	7.32	\$ 659.14	\$ 7.94	1.22%
Energy Next	0	20.79	\$ -	21.03	\$ -	\$ -	0.00%
Customer Charge			\$ 525.85		\$ 531.93	\$ 6.08	1.16%
SUBTOTAL			\$ 1,177.05		\$ 1,191.07	\$ 14.02	1.19%
FX Adjust		1.94%	\$ 22.84	1.94%	\$ 23.11	\$ 0.27	1.19%
Fuel Charge	90	21.308	\$ 1,917.69	21.305	\$ 1,917.42	\$ (0.27)	-0.01%
IPP Variable Charge	90	11.280	\$ 1,015.16	11.280	\$ 1,015.16	\$ -	0.00%
True-Up Adjustment	90	-0.523	\$ (47.05)	-0.113	\$ (10.17)	\$ 36.88	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 4,085.68		\$ 4,136.59	\$ 36.62	0.90%
G.C.T			-		-		
BILL TOTAL			\$ 4,085.68		\$ 4,136.59	\$ 50.91	1.25%

2.2 Bill Comparison for a Typical Rate 10 Consumer with consumption 101kWh <= 150kWh

Usage 150 kWh

Rate 10	July Bill-Before			July Bill-After		Bill Impact	
Above 100 but ≤ 150 kWh	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
150		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
ENERGY							
Energy 1st	100	7.24	\$ 723.55	7.32	\$ 732.37	\$ 8.82	1.22%
Energy Next	50	20.79	\$ 1,039.47	21.03	\$ 1,051.52	\$ 12.06	0.00%
Customer Charge			\$ 525.85		\$ 531.93	\$ 6.08	1.16%
SUBTOTAL			\$ 2,288.87		\$ 2,315.83	\$ 26.96	1.18%
FX Adjust		1.94%	\$ 44.41	1.94%	\$ 44.93	\$ 0.52	1.18%
Fuel Charge	150	21.308	\$ 3,196.15	21.305	\$ 3,195.70	\$ (0.45)	-0.01%
IPP Variable Charge	150	11.280	\$ 1,691.94	11.280	\$ 1,691.94	\$ -	0.00%
True-Up Adjustment	150	-0.523	\$ (78.42)	-0.113	\$ (16.95)	\$ 61.47	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 7,142.94		\$ 7,231.45	\$ 61.03	0.85%
G.C.T			-		-		
BILL TOTAL			\$ 7,142.94		\$ 7,231.45	\$ 88.51	1.24%

2.3 Bill Comparison for a Typical Rate 10 Consumer with consumption 150kWh and above Usage 160 kWh

Rate 10	July Bill-Before			July Bill-After		Bill Impact	
Above 150 kWh	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
160		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
ENERGY							
Energy 1st	100	7.24	\$ 723.55	7.32	\$ 732.37	\$ 8.82	1.22%
Energy Next	60	20.79	\$ 1,247.36	21.03	\$ 1,261.83	\$ 14.47	0.00%
Customer Charge			\$ 525.85		\$ 531.93	\$ 6.08	1.16%
SUBTOTAL			\$ 2,496.77		\$ 2,526.14	\$ 29.37	1.18%
FX Adjust		1.94%	\$ 48.44	1.94%	\$ 49.01	\$ 0.57	1.18%
Fuel Charge	160	21.308	\$ 3,409.22	21.305	\$ 3,408.75	\$ (0.48)	-0.01%
IPP Variable Charge	160	11.280	\$ 1,804.73	11.280	\$ 1,804.73	\$ -	0.00%
True-Up Adjustment	160	-0.523	\$ (83.65)	-0.113	\$ (18.08)	\$ 65.57	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 7,675.51		\$ 7,770.55	\$ 65.09	0.85%
G.C.T			\$ 79.89		\$ 80.86		
BILL TOTAL			\$ 7,755.40		\$ 7,851.41	\$ 96.01	1.24%

2.4 Bill Comparison for a Typical Rate 20 Consumer with consumption ≤ 100 kWh Usage 90 kWh

Rate 20	July Bill-Before			July Bill-After		Bill Impact	
90	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
90		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
Energy	90	8.93	\$ 803.34	9.03	\$ 813.00	\$ 9.66	1.20%
Customer Charge			\$ 1,121.23		\$ 1,134.20	\$ 12.97	1.16%
SUBTOTAL			\$ 1,924.57		\$ 1,947.20	\$ 22.63	1.18%
FX Adjust		1.94%	\$ 37.34	1.94%	\$ 37.78	\$ 0.44	1.18%
Fuel Charge	90	21.308	\$ 1,917.69	21.305	\$ 1,917.42	\$ (0.27)	-0.01%
IPP Variable Charge	90	18.773	\$ 1,689.56	18.773	\$ 1,689.56	\$ -	0.00%
True-Up Adjustment	90	-0.523	\$ (47.05)	-0.113	\$ (10.17)	\$ 36.88	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 5,522.11		\$ 5,581.79	\$ 36.62	0.66%
G.C.T			\$ 828.32		\$ 837.27		
BILL TOTAL			\$ 6,350.42		\$ 6,419.05	\$ 68.63	1.08%

2.5 Bill Comparison for a Typical Rate 20 Consumer with consumption 101kWh - 1000kWh Usage 750 kWh

Rate 20	July Bill-Before			July Bill-After		Bill Impact	
750	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
750		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
Energy	750	8.93	\$ 6,694.49	9.03	\$ 6,774.97	\$ 80.48	1.20%
Customer Charge			\$ 1,121.23		\$ 1,134.20	\$ 12.97	1.16%
SUBTOTAL			\$ 7,815.72		\$ 7,909.17	\$ 93.45	1.20%
FX Adjust		1.94%	\$ 151.63	1.94%	\$ 153.44	\$ 1.81	1.20%
Fuel Charge	750	21.308	\$ 15,980.74	21.305	\$ 15,978.51	\$ (2.23)	-0.01%
IPP Variable Charge	750	18.773	\$ 14,079.69	18.773	\$ 14,079.69	\$ -	0.00%
True-Up Adjustment	750	-0.523	\$ (392.11)	-0.113	\$ (84.75)	\$ 307.36	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 37,635.67		\$ 38,036.06	\$ 305.13	0.81%
G.C.T			\$ 5,645.35		\$ 5,705.41		
BILL TOTAL			\$ 43,281.02		\$ 43,741.47	\$ 460.45	1.06%

2.6 Bill Comparison for a Typical Rate 20 Consumer with consumption 1001kWh - 7500kWh

Usage 5000 kWh

Rate 20	July Bill-Before			July Bill-After			Bill Impact	
Description	Usage kWh	2020 Rates		2021 Adjusted Rates		JMD Change	% Change	
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate			
5000		145.00	148.52	145.00	148.52			
		Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)			
Energy	5000	8.93	\$ 44,629.92	9.03	\$ 45,166.46	\$ 536.54	1.20%	
Customer Charge			\$ 1,121.23		\$ 1,134.20	\$ 12.97	1.16%	
SUBTOTAL			\$ 45,751.15		\$ 46,300.66	\$ 549.51	1.20%	
FX Adjust		1.94%	\$ 887.61	1.94%	\$ 898.27	\$ 10.66	1.20%	
Fuel Charge	5000	21.308	\$ 106,538.24	21.305	\$ 106,523.39	\$ (14.85)	-0.01%	
IPP Variable Charge	5000	18.773	\$ 93,864.62	18.773	\$ 93,864.62	\$ -	0.00%	
True-Up Adjustment	5000	-0.523	\$ (2,614.05)	-0.113	\$ (565.00)	\$ 2,049.05	-78.39%	
TOTAL ELECTRICITY CHARGES			\$ 244,427.56		\$ 247,021.93	\$ 2,034.20	0.83%	
G.C.T			36,664.13		37,053.29			
BILL TOTAL			\$ 281,091.69		\$ 284,075.22	\$ 2,983.53	1.06%	

2.7 Bill Comparison for a Typical Rate 40 (Std.) Consumer

Usage 35,000 kWh

Demand 100 kVA

Rate 40 LV (Std)	July Bill-Before			July Bill-After			Bill Impact	
Description	Usage kWh	2020 Rates		2021 Adjusted Rates		JMD Change	% Change	
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate			
35,000		145.00	148.52	145.00	148.52			
		Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)			
Energy (kWh Std)	35,000	6.02	\$ 210,700.00	6.09	\$ 213,137.12	\$ 2,437.12	1.16%	
Demand (kVA Std)	100	2705.83	\$ 270,583.00	2737.13	\$ 273,712.78	\$ 3,129.78	0.00%	
Customer Charge			\$ 7,899.62		\$ 7,990.99	\$ 91.38	1.16%	
SUBTOTAL			\$ 489,182.62		\$ 494,840.89	\$ 5,658.28	1.16%	
FX Adjust		1.94%	\$ 9,490.55	1.94%	\$ 9,600.32	\$ 109.78	1.16%	
Fuel Charge	35,000	20.46	\$ 715,936.97	20.45	\$ 715,837.17	\$ (99.80)	-0.01%	
IPP Variable Charge	35,000	1.08	\$ 37,963.16	1.08	\$ 37,963.16	\$ -	0.00%	
IPP Fixed Charge	100	664.67	\$ 66,466.62	664.67	\$ 66,466.62	\$ -	0.00%	
True-Up Adjustment	35,000	-0.523	\$ (18,298.36)	-0.113	\$ (3,955.00)	\$ 14,343.36	-78.39%	
TOTAL ELECTRICITY CHARGES			\$ 1,300,741.55		\$ 1,320,753.16	\$ 20,011.61	1.54%	
G.C.T			195,111.23		198,112.97			
BILL TOTAL			\$ 1,495,852.78		\$ 1,518,866.13	\$ 23,013.35	1.54%	

2.8 Bill Comparison for a Typical Rate 50 (Std.) Consumer

Usage 500,000 kWh

Demand 1500 kVA

Rate 50 MV (Std)	July Bill-Before			July Bill-After		Bill Impact	
Description	2020 Rates			2021 Adjusted Rates		Bill Impact	
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
500,000		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
Energy (kWh Std)	500,000	4.27	\$ 2,135,000.00	4.32	\$ 2,159,695.10	\$ 24,695.10	1.16%
Demand (kVA Std)	1500	1874.86	\$ 2,812,290.00	1896.55	\$ 2,844,819.17	\$ 32,529.17	0.00%
Customer Charge			\$ 7,899.62		\$ 7,990.99	\$ 91.38	1.16%
SUBTOTAL			\$ 4,955,189.62		\$ 5,012,505.26	\$ 57,315.64	1.16%
FX Adjust		1.94%	\$ 96,134.78	1.94%	\$ 97,246.75	\$ 1,111.97	1.16%
Fuel Charge	500,000	20.46	\$ 10,227,671.00	20.45	\$ 10,226,245.24	\$ (1,425.76)	-0.01%
IPP Variable Charge	500,000	2.56	\$ 1,281,337.07	2.56	\$ 1,281,337.07	\$ -	0.00%
IPP Fixed Charge	1500	1745.29	\$ 2,617,940.93	1745.29	\$ 2,617,940.93	\$ -	0.00%
True-Up Adjustment	500,000	-0.523	\$ (261,405.17)	-0.113	\$ (56,500.00)	\$ 204,905.17	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 18,916,868.22		\$ 19,178,775.25	\$ 261,907.03	1.38%
G.C.T			2,837,530.23		2,876,816.29		
BILL TOTAL			\$ 21,754,398.45		\$ 22,055,591.53	\$ 301,193.08	1.38%

2.9 Bill Comparison for a Typical Rate 70 (Std.) Consumer

Usage 500,000 kWh

Demand 2000 kVA

Rate 70 Power Service (Std)	July Bill-Before			July Bill-After		Bill Impact	
Description	2020 Rates			2021 Adjusted Rates		Bill Impact	
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
500,000		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
Energy (kWh Std)	500,000	4.26	\$ 2,130,000.00	4.31	\$ 2,154,637.26	\$ 24,637.26	1.16%
Demand (kVA Std)	2000	2484.93	\$ 4,969,860.00	2513.67	\$ 5,027,345.33	\$ 57,485.33	0.00%
Customer Charge			\$ 7,899.62		\$ 7,990.99	\$ 91.38	1.16%
SUBTOTAL			\$ 7,107,759.62		\$ 7,189,973.58	\$ 82,213.97	1.16%
FX Adjust		1.94%	\$ 137,896.42	1.94%	\$ 139,491.44	\$ 1,595.02	1.16%
Fuel Charge	500,000	20.46	\$ 10,227,671.00	20.45	\$ 10,226,245.24	\$ (1,425.76)	-0.01%
IPP Variable Charge	500,000	0.10	\$ 52,481.18	0.10	\$ 52,481.18	\$ -	0.00%
IPP Fixed Charge	2000	424.14	\$ 848,272.50	424.14	\$ 848,272.50	\$ -	0.00%
True-Up Adjustment	500,000	-0.523	\$ (261,405.17)	-0.113	\$ (56,500.00)	\$ 204,905.17	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 18,112,675.54		\$ 18,399,963.94	\$ 287,288.40	1.59%
G.C.T			2,716,901.33		2,759,994.59		
BILL TOTAL			\$ 20,829,576.88		\$ 21,159,958.53	\$ 330,381.66	1.59%

2.10 Estimated Bill Impact of JPS's Proposed Annual Tariff Adjustment

Bill Comparison for a Typical Rate 10 Consumer with consumption < 100 kW Usage 90 kWh

Rate 10	July Bill-Before			July Bill-After			
Below 100 kWh	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
90		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
ENERGY							
Energy 1st	90	7.24	\$ 651.20	8.13	\$ 731.70	\$ 80.50	12.36%
Energy Next	0	20.79	\$ -	23.35	\$ -	\$ -	0.00%
Customer Charge			\$ 525.85		\$ 590.50	\$ 64.65	12.29%
SUBTOTAL			\$ 1,177.05		\$ 1,322.20	\$ 145.15	12.33%
FX Adjust		1.94%	\$ 22.84	1.94%	\$ 25.65	\$ 2.82	12.33%
Fuel Charge	90	21.308	\$ 1,917.69	21.440	\$ 1,929.58	\$ 11.90	0.62%
IPP Variable Charge	90	11.280	\$ 1,015.16	11.280	\$ 1,015.16	\$ -	0.00%
True-Up Adjustment	90	-0.523	\$ (47.05)	-0.113	\$ (10.17)	\$ 36.88	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 4,085.68		\$ 4,282.43	\$ 48.78	1.19%
G.C.T			-		-		
BILL TOTAL			\$ 4,085.68		\$ 4,282.43	\$ 196.74	4.82%

2.11 Bill Comparison for a Typical Rate 10 Consumer with consumption 101kWh <= 150kWh

Usage 150 kWh

Rate 10	July Bill-Before			July Bill-After			
Above 100 but ≤ 150 kWh	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
150		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
ENERGY							
Energy 1st	100	7.24	\$ 723.55	8.13	\$ 813.00	\$ 89.45	12.36%
Energy Next	50	20.79	\$ 1,039.47	23.35	\$ 1,167.50	\$ 128.03	0.00%
Customer Charge			\$ 525.85		\$ 590.50	\$ 64.65	12.29%
SUBTOTAL			\$ 2,288.87		\$ 2,571.00	\$ 282.13	12.33%
FX Adjust		1.94%	\$ 44.41	1.94%	\$ 49.88	\$ 5.47	12.33%
Fuel Charge	150	21.308	\$ 3,196.15	21.440	\$ 3,215.97	\$ 19.83	0.62%
IPP Variable Charge	150	11.280	\$ 1,691.94	11.280	\$ 1,691.94	\$ -	0.00%
True-Up Adjustment	150	-0.523	\$ (78.42)	-0.113	\$ (16.95)	\$ 61.47	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 7,142.94		\$ 7,511.84	\$ 81.30	1.14%
G.C.T			-		-		
BILL TOTAL			\$ 7,142.94		\$ 7,511.84	\$ 368.90	5.16%

2.12 Bill Comparison for a Typical Rate 10 Consumer with consumption 150kWh and above

Usage 160 kWh

Rate 10	July Bill-Before			July Bill-After		Bill Impact	
Above 150 kWh	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
160		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
ENERGY							
Energy 1st	100	7.24	\$ 723.55	8.13	\$ 813.00	\$ 89.45	12.36%
Energy Next	60	20.79	\$ 1,247.36	23.35	\$ 1,401.00	\$ 153.64	0.00%
Customer Charge			\$ 525.85		\$ 590.50	\$ 64.65	12.29%
SUBTOTAL			\$ 2,496.77		\$ 2,804.50	\$ 307.73	12.33%
FX Adjust		1.94%	\$ 48.44	1.94%	\$ 54.41	\$ 5.97	12.33%
Fuel Charge	160	21.308	\$ 3,409.22	21.440	\$ 3,430.37	\$ 21.15	0.62%
IPP Variable Charge	160	11.280	\$ 1,804.73	11.280	\$ 1,804.73	-	0.00%
True-Up Adjustment	160	-0.523	\$ (83.65)	-0.113	\$ (18.08)	\$ 65.57	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 7,675.51		\$ 8,075.94	\$ 86.72	1.13%
G.C.T			\$ 79.89		\$ 84.61		
BILL TOTAL			\$ 7,755.40		\$ 8,160.55	\$ 405.15	5.22%

2.13 Bill Comparison for a Typical Rate 20 Consumer with consumption ≤ 100 kWh

Usage 90 kWh

Rate 20	July Bill-Before			July Bill-After		Bill Impact	
90	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
90		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
Energy	90	8.93	\$ 803.34	10.03	\$ 902.70	\$ 99.36	12.37%
Customer Charge			\$ 1,121.23		\$ 1,259.09	\$ 137.86	12.30%
SUBTOTAL			\$ 1,924.57		\$ 2,161.79	\$ 237.22	12.33%
FX Adjust		1.94%	\$ 37.34	1.94%	\$ 41.94	\$ 4.60	12.33%
Fuel Charge	90	21.308	\$ 1,917.69	21.440	\$ 1,929.58	\$ 11.90	0.62%
IPP Variable Charge	90	18.773	\$ 1,689.56	18.773	\$ 1,689.56	-	0.00%
True-Up Adjustment	90	-0.523	\$ (47.05)	-0.113	\$ (10.17)	\$ 36.88	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 5,522.11		\$ 5,812.71	\$ 48.78	0.88%
G.C.T			\$ 828.32		\$ 871.91		
BILL TOTAL			\$ 6,350.42		\$ 6,684.61	\$ 334.19	5.26%

2.14 Bill Comparison for a Typical Rate 20 Consumer with consumption 101kWh - 1000kWh

Usage 750 kWh

Rate 20	July Bill-Before			July Bill-After		Bill Impact	
750	2020 Rates			2021 Adjusted Rates		Bill Impact	
Description		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate	JMD Change	% Change
750		145.00	148.52	145.00	148.52		
	Usage kWh	Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)		
Energy	750	8.93	\$ 6,694.49	10.03	\$ 7,522.50	\$ 828.01	12.37%
Customer Charge			\$ 1,121.23		\$ 1,259.09	\$ 137.86	12.30%
SUBTOTAL			\$ 7,815.72		\$ 8,781.59	\$ 965.87	12.36%
FX Adjust		1.94%	\$ 151.63	1.94%	\$ 170.37	\$ 18.74	12.36%
Fuel Charge	750	21.308	\$ 15,980.74	21.440	\$ 16,079.87	\$ 99.13	0.62%
IPP Variable Charge	750	18.773	\$ 14,079.69	18.773	\$ 14,079.69	-	0.00%
True-Up Adjustment	750	-0.523	\$ (392.11)	-0.113	\$ (84.75)	\$ 307.36	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 37,635.67		\$ 39,026.77	\$ 406.49	1.08%
G.C.T			\$ 5,645.35		\$ 5,854.02		
BILL TOTAL			\$ 43,281.02		\$ 44,880.79	\$ 1,599.77	3.70%

2.15 Bill Comparison for a Typical Rate 20 Consumer with consumption 1001kWh - 7500kWh

Usage 5000 kWh

Rate 20	July Bill-Before			July Bill-After			Bill Impact	
Description	Usage kWh	2020 Rates		2021 Adjusted Rates		JMD Change	% Change	
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate			
5000		145.00	148.52	145.00	148.52			
		Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)			
Energy	5000	8.93	\$ 44,629.92	10.03	\$ 50,150.00	\$ 5,520.08	12.37%	
Customer Charge			\$ 1,121.23		\$ 1,259.09	\$ 137.86	12.30%	
SUBTOTAL			\$ 45,751.15		\$ 51,409.09	\$ 5,657.94	12.37%	
FX Adjust		1.94%	\$ 887.61	1.94%	\$ 997.38	\$ 109.77	12.37%	
Fuel Charge	5000	21.308	\$ 106,538.24	21.440	\$ 107,199.14	\$ 660.90	0.62%	
IPP Variable Charge	5000	18.773	\$ 93,864.62	18.773	\$ 93,864.62	\$ -	0.00%	
True-Up Adjustment	5000	-0.523	\$ (2,614.05)	-0.113	\$ (565.00)	\$ 2,049.05	-78.39%	
TOTAL ELECTRICITY CHARGES			\$ 244,427.56		\$ 252,905.22	\$ 2,709.95	1.11%	
G.C.T			36,664.13		37,935.78			
BILL TOTAL			\$ 281,091.69		\$ 290,841.00	\$ 9,749.31	3.47%	

2.16 Bill Comparison for a Typical Rate 40 (Std.) Consumer

Usage 35,000 kWh

Demand 100 kVA

Rate 40 LV (Std)	July Bill-Before			July Bill-After			Bill Impact	
Description	Usage kWh	2020 Rates		2021 Adjusted Rates		JMD Change	% Change	
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate			
35,000		145.00	148.52	145.00	148.52			
		Rate (J\$)	Total (J\$)	Rate (J\$)	Total (J\$)			
Energy (kWh Std)	35,000	6.02	\$ 210,700.00	6.76	\$ 236,600.00	\$ 25,900.00	12.29%	
Demand (kVA Std)	100	2705.83	\$ 270,583.00	3038.52	\$ 303,852.00	\$ 33,269.00	0.00%	
Customer Charge			\$ 7,899.62		\$ 8,870.90	\$ 971.28	12.30%	
SUBTOTAL			\$ 489,182.62		\$ 549,322.90	\$ 60,140.28	12.29%	
FX Adjust		1.94%	\$ 9,490.55	1.94%	\$ 10,657.32	\$ 1,166.77	12.29%	
Fuel Charge	35,000	20.46	\$ 715,936.97	20.58	\$ 720,378.20	\$ 4,441.23	0.62%	
IPP Variable Charge	35,000	1.08	\$ 37,963.16	1.08	\$ 37,963.16	\$ -	0.00%	
IPP Fixed Charge	100	664.67	\$ 66,466.62	664.67	\$ 66,466.62	\$ -	0.00%	
True-Up Adjustment	35,000	-0.523	\$ (18,298.36)	-0.113	\$ (3,955.00)	\$ 14,343.36	-78.39%	
TOTAL ELECTRICITY CHARGES			\$ 1,300,741.55		\$ 1,380,833.20	\$ 18,784.60	1.44%	
G.C.T			195,111.23		207,124.98			
BILL TOTAL			\$ 1,495,852.78		\$ 1,587,958.18	\$ 92,105.40	6.16%	

2.17 Bill Comparison for a Typical Rate 50 (Std.) Consumer

Usage 500,000 kWh

Demand 1500 kVA

Rate 50 MV (Std)	July Bill-Before			July Bill-After		Bill Impact	
Description	Usage kWh	2020 Rates		2021 Adjusted Rates		JMD Change	% Change
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate		
500,000		145.00	148.52	145.00	148.52		
	Rate (J\$)	Total (J\$)		Rate (J\$)	Total (J\$)		
Energy (kWh Std)	500,000	4.27	\$ 2,135,000.00	4.80	\$ 2,400,000.00	\$ 265,000.00	12.41%
Demand (kVA Std)	1500	1874.86	\$ 2,812,290.00	2105.38	\$ 3,158,070.00	\$ 345,780.00	0.00%
Customer Charge			\$ 7,899.62		\$ 8,870.90	\$ 971.28	12.30%
SUBTOTAL			\$ 4,955,189.62		\$ 5,566,940.90	\$ 611,751.28	12.35%
FX Adjust		1.94%	\$ 96,134.78	1.94%	\$ 108,003.26	\$ 11,868.48	12.35%
Fuel Charge	500,000	20.46	\$ 10,227,671.00	20.58	\$ 10,291,117.20	\$ 63,446.21	0.62%
IPP Variable Charge	500,000	2.56	\$ 1,281,337.07	2.56	\$ 1,281,337.07	\$ -	0.00%
IPP Fixed Charge	1500	1745.29	\$ 2,617,940.93	1745.29	\$ 2,617,940.93	\$ -	0.00%
True-Up Adjustment	500,000	-0.523	\$ (261,405.17)	-0.113	\$ (56,500.00)	\$ 204,905.17	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 18,916,868.22		\$ 19,808,839.36	\$ 268,351.38	1.42%
G.C.T			2,837,530.23		2,971,325.90		
BILL TOTAL			\$ 21,754,398.45		\$ 22,780,165.27	\$ 1,025,766.81	4.72%

2.18 Bill Comparison for a Typical Rate 70 (Std.) Consumer

Usage 500,000 kWh

Demand 2000 kVA

Rate 70 Power Service (Std)	July Bill-Before			July Bill-After		Bill Impact	
Description	Usage kWh	2020 Rates		2021 Adjusted Rates		JMD Change	% Change
		Base Exch. Rate	Billing F/X Rate	Base Exch. Rate	Billing F/X Rate		
500,000		145.00	148.52	145.00	148.52		
	Rate (J\$)	Total (J\$)		Rate (J\$)	Total (J\$)		
Energy (kWh Std)	500,000	4.26	\$ 2,130,000.00	4.78	\$ 2,390,000.00	\$ 260,000.00	12.21%
Demand (kVA Std)	2000	2484.93	\$ 4,969,860.00	2790.46	\$ 5,580,920.00	\$ 611,060.00	0.00%
Customer Charge			\$ 7,899.62		\$ 8,870.90	\$ 971.28	12.30%
SUBTOTAL			\$ 7,107,759.62		\$ 7,979,790.90	\$ 872,031.28	12.27%
FX Adjust		1.94%	\$ 137,896.42	1.94%	\$ 154,814.55	\$ 16,918.13	12.27%
Fuel Charge	500,000	20.46	\$ 10,227,671.00	20.58	\$ 10,291,117.20	\$ 63,446.21	0.62%
IPP Variable Charge	500,000	0.10	\$ 52,481.18	0.10	\$ 52,481.18	\$ -	0.00%
IPP Fixed Charge	2000	424.14	\$ 848,272.50	424.14	\$ 848,272.50	\$ -	0.00%
True-Up Adjustment	500,000	-0.523	\$ (261,405.17)	-0.113	\$ (56,500.00)	\$ 204,905.17	-78.39%
TOTAL ELECTRICITY CHARGES			\$ 18,112,675.54		\$ 19,269,976.33	\$ 268,351.38	1.48%
G.C.T			2,716,901.33		2,890,496.45		
BILL TOTAL			\$ 20,829,576.88		\$ 22,160,472.78	\$ 1,330,895.91	6.39%

2.19 Approved Fuel Rates: Simulated as at 2021 June

BILLING EXCHANGE RATE J\$148.5164 = US\$1.00				
OUR Approved Heat Rate Target= 9,667				
Fuel Rates for June 2021				
Class	Std.	Off Peak	Partial Peak	On Peak
Rate 10				
- 1st. 100 kWh	21.305			
- Over 100 kWh	21.305			
Rate 20	21.305			
Rate 40 LV	20.452	17.044	22.251	27.730
Rate 40A LV	20.452			
Rate 50 MV	20.452	17.044	22.251	27.730
Rate 60	20.452			
Rate 70	20.452	17.044	22.251	27.730
Traffic Signal	20.452			
Electric Vehicles	21.305	17.044	22.251	27.730
IPP Rates for June 2021				
Class	IPP Variable TOU Rate J\$/kWh	IPP Variable Rate J\$/kWh	IPP Fixed Rate J\$/kVa	
Rate 10		11.28		
- 1st. 100 kWh				
- Over 100 kWh				
Rate 20		18.77		
Rate 40 LV		1.08	664.67	
Rate 40 TOU	2.16		1,003.76	
Rate 50 MV		2.56	1,745.29	
Rate 50 TOU	2.23		831.79	
Rate 60 & Traffic Signal		17.44		
Rate 70		0.10	424.14	
Rate 70 TOU	0.20		92.71	
Electric Vehicles		11.28		

ANNEX 3

3.1 COMPONENTS OF THE TOTAL REVENUE GAP

The Total Revenue Gap (TRG) is:

$$\begin{aligned} \mathbf{TRG} &= \text{Revenue Target} - \text{Actual Revenue} \\ &= P_T Q_T - P_A Q_A \end{aligned} \tag{Eq_1}$$

Where:

$$\begin{aligned} P_T &= \text{Price Target} \\ P_A &= \text{Actual Price} \\ Q_T &= \text{Volume Target} \\ Q_A &= \text{Actual Volume} \end{aligned}$$

As set out in Schedule 3, Exhibit 1 the Volumetric True-up (*TUV*) is:

$$\begin{aligned} \text{Volumetric True-Up} &= \text{Volume Variance} \times \text{Revenue Target} \\ \mathbf{TUV} &= \left[\frac{Q_T - Q_A}{Q_T} \right] R_T \end{aligned} \tag{Eq_2}$$

Where:

$$R_T = \text{Revenue Target}$$

Hence:

$$\begin{aligned} \mathbf{TUV} &= \left[\frac{Q_T - Q_A}{Q_T} \right] P_T Q_T \\ &= \left[1 - \frac{Q_A}{Q_T} \right] P_T Q_T \\ &= P_T Q_T - P_T Q_A \end{aligned} \tag{Eq_3}$$

By adding and subtracting $P_T Q_A$ from, *Eq_1* we get:

$$\begin{aligned} \mathbf{TRG} &= P_T Q_T - P_A Q_A + P_T Q_A - P_T Q_A \\ &= [P_T Q_T - P_T Q_A] + [P_T Q_A - P_A Q_A] \\ \mathbf{TRG} &= \mathbf{TUV} + [P_T Q_A - P_A Q_A] \end{aligned}$$

Therefore,

$$\mathbf{TRG} = TUV + ARG$$

Therefore, since the Volume True-up (*TUV*) is already a part of the Annual Revenue Target formulae (*ART_y*) in addressing JPS's Claim for a revenue gap arising from the late implementation of the rate, the only components of the **TRG** that should be taken into account is the Actual Residual Gap (**ARG**).

$$\mathbf{ARG} = P_T Q_A - P_A Q_A$$