THE JAMAICA PUBLIC SERVICE CO. LTD.

ANNUAL TARIFF ADJUSTMENT

SUBMISSION FOR 2006

APRIL 3, 2006

Preamble

This submission is made in relation to the annual Performance-Based Rate-Making (PBRM) tariff adjustment filing for 2006, in accordance with the All Island Electric Licence 2001 (the Licence), Schedule 3, section 4, which states:

> "The Licensee shall make annual filings to *the Office* at least sixty (60) days prior to the Adjustment Date [June 1, 2006]. These filings shall include the support for the performance indices, the CPI indices, and the proposed Non-Fuel Base Rates for electricity, and other information as may be necessary to support such filings…."

In accordance with the Licence and the OUR's June 25, 2004 Determination Notice, the 2006 annual non-fuel tariff adjustment will incorporate changes in relation to inflation, foreign exchange movement and adjustments for the X, Q and Z factors.

This represents the second annual tariff adjustment under the new regulatory framework which began effective June 1, 2004. Unfortunately, this year has been marked by:

- relatively high inflation, with U.S. and Jamaica inflation rates of 3.6% and 12.4% respectively; and
- sustained high oil prices on the world markets.

However, this year also represents the first year in which a 2.72% productivity gain will be passed on to our customers. This productivity gain will act as a constant 2.72% offset against the inflation adjustment to tariffs for the remaining tariff period (2006-2009).

Accordingly, the result is, that, while there is a 5.5% weighted average increase in inflation under the annual tariff adjustment mechanism, this will be offset by the 2.72% productivity factor, resulting in an effective increase of 2.78% in the non-fuel tariffs in June 2006. Given current fuel prices, which account for approximately 55% of customers' total bills, the total bill impact from this increase is expected to be approximately 1.25%.

It is noteworthy, that, while the impact of hurricane storm damage was relatively insignificant in 2005 from an annual tariff adjustment perspective, the potential for catastrophic damage exists, as reminded by hurricanes Dennis, Emily and Wilma in 2005. JPS believes that the Licence appropriately contemplates events such as hurricanes under the Z-factor, with the overall view of providing the correct set of incentives to the company to ensure that it operates efficiently, continues to improve its productivity and remains financially viable so as to attract the necessary financing which is required on an ongoing basis in this highly capital intensive business. This is fundamental to ensuring that JPS is able to meet its service obligations under the Licence and that it operates in an efficient manner.

Preamble (Cont'd)

In this vein, JPS recognises that it has a significant challenge in the form of system losses (specifically the theft of electricity), which is exacerbated by rising electricity costs resulting from increasing fuel prices, currency depreciation and inflation. JPS continues to pursue various strategies aimed at reducing losses, as these negatively impact both the company and its customers. This includes intensifying our efforts and improving our effectiveness; however, the resolution of this problem also requires a national commitment to reducing crime.

JPS remains committed to continuous improvement in its customer service provisions. This is demonstrated by our move towards monthly meter readings for all customers, our commitment to ensure that all future generation expansion projects contribute towards reducing electricity costs while also providing better diversification in our fuel stock, and by our deliberate efforts to improve customer service.

JPS believes that this submission is made in the best interests of all stakeholders and in accordance with the Licence. JPS remains committed to the long-term development of Jamaica under the regulatory guidance of the OUR.

Glossary

ABNF	-	Adjusted Non-fuel base rate
ADC	-	Average Dependable Capacity
CAPM	-	Capital Asset Pricing Model
CAIDI	-	Customer Average Interruption Duration Index
CIS	-	Customer Information System
CML	-	Customer Minutes Lost
CPI	-	Consumer Price Index
CRP	-	Country Risk Premium
CT	-	Current Transformer
CWIP	-	Construction Work in Progress
DCF	-	Discounted Cash Flow
DEA	-	Data Envelope Analysis
EFLOP	-	Equivalent Full Load Provision
EMS	-	Environmental Management System
GDP	-	Gross Domestic Product
GOJ	-	Government of Jamaica
IPP	-	Independent Power Purchase
IVR	-	Interactive Voice Response
kVA	-	Kilo Volt Amperes
kWh	-	Kilowatt-hours
Licence	-	The All Island Electric Licence 2001
MVA	-	Mega Volt Amperes
MW	-	Megawatt
MWh	-	Megawatt-hours
NWC	-	National Water Commission
O&M	-	Operating and Maintenance
PBRM	-	Performance Based Rate-Making Mechanism
RDC	-	Required Dependable Capacity
REP	-	Rural Electrification Programme Limited
RPD	-	Revenue Protection Department
SAIDI	-	System Average Interruption Duration Index
SAIFI	-	System Average Interruption Frequency Index

Glossary (Cont'd)

SCADA	-	Supervisory Control and Data Acquisition
SFA	-	Stochastic Frontier Analysis
PT	-	Potential Transformer
T&D	-	Transmission & Distribution
TFP	-	Total Factor Productivity
TOU	-	Time of Use
WACC	-	Weighted Average Cost of Capital

Contents

Section 1: PBRM Annual Adjustment

1.1 Overview

According to Exhibit 1 in the Licence:

> "The Non-Fuel Base Rate for each customer class shall be adjusted on an annual basis, commencing June 1, 2004, *(Adjustment Date)*, pursuant to the following formula:
>
> $$ABNF_y = ABNF_{y-1}\ (1 + dPCI)$$
>
> Where:
>
> $ABNF_y$ = Adjusted Non-Fuel Base Rate for Year "y"
>
> $ABNF_{y-1}$ = Non-Fuel Base Rate prior to adjustment
>
> dPCI = Annual rate of change in the non-fuel electricity prices as defined below
>
> PCI = Non-fuel Electricity Pricing Index
>
> "The annual PBRM filing will follow the general framework where the annual rate of change in non-fuel electricity prices (dPCI) will be determined through the following formula:
>
> $$dPCI = dI \pm X \pm Q \pm Z$$
>
> Where:
>
> | | | |
> |---|---|---|
> | dI | = | the annual growth rate in an inflation and devaluation measure; |
> | X | = | the offset to inflation (annual real price increase or decrease) resulting from productivity changes in the electricity industry; |
> | Q | = | the allowed price adjustment to reflect changes in the quality of service provided to the customers; and |
> | Z | = | the allowed rate of price adjustment for special reasons not captured by the other elements of the formula. |

The dPCI above was modified on page 13 of the OUR's June 25, 2004 Determination Notice as follows:

> "The price cap will be applied on a global basis. Specifically, the annual adjustment factor (1 + dPCI) will be applied to the tariff basket instead of the individual tariff. The adjustment in each tariff will be weighted by an associated quantity for each element. The weighted average increase of the tariff basket must not exceed the price adjustment factor (1 + dPCI)."

1.1 Overview (Cont'd)

The OUR's Determination Notice further states that:

> "The inflation adjustment formula (dI) to be used during the 2004-2009 tariff period has been changed to more accurately reflect the inflation costs incurred on JPS. The base non-fuel tariffs shall be adjusted annually, as follows:
>
> $$\mathbf{b_1 = b_0 [1 + dI]}$$
>
> $$\mathbf{dI = [0.76 * e + 0.76 * 0.922 * e*i_{US} + 0.76 * 0.922 * i_{US} + 0.24 * i_j}$$
>
> where:
>
> b_0 = Base non-fuel tariff at time period t = 0
>
> b_1 = Base non-fuel tariff at time period t = 1
>
> e = Percentage change in the Base Exchange Rate
>
> i_{US} = US inflation rate (as defined in the Licence)
>
> i_j = Jamaican inflation rate (as defined in the Licence)
>
> 0.76 = US factor
>
> 0.24 = Local (Jamaica) factor

1.2 Details of the current year annual inflation adjustment (dI)

The annual adjustment allows JPS to adjust its rates to reflect general movements in prices, improvements in productivity, changes in service quality and unforeseen occurrences beyond management control not captured in the licence. The following outlines JPS' proposals in relation to the components of dPCI and its application to the non-fuel tariffs.

The application of the above formula results in an inflation adjustment factor of 9.3%, derived using the following factors:

- The Jamaican twelve month point to point inflation rate to February 28, 2006 of 12.41%, derived from the most recent CPI data[1] (see Appendix I);
- The U.S. twelve month point to point inflation rate to February 28, 2006 of 3.6%, derived from the U.S. Department of Labour statistical data[2] (see Appendix I); and
- The change in the base exchange rate from J$62:US$1 to J$65:US$1

Table 1.1 below sets out the details to the escalator factor (dI only) which amounts to 9.3% for 2006. Of this 9.3% increase, 3.8% is attributable to the resetting of the base exchange rate, so the real increase in non-fuel rates for customers would be 5.5%, since the foreign exchange component is already reflected in customer bills under the foreign exchange adjustment line each month. The details of the X-factor reduction to the annual escalator factor are provided in section 1.4.

[1] Obtained from the Statistical Institute of Jamaica.
[2] Obtained from U.S. Bureau of Labour Statistics website, http://data.bls.gov/cgi-bin/surveymost

1.2 Details of the current year annual inflation adjustment (dI) (Cont'd)

Table 1.1

Escalation Factor (dI)

Line	Description	Formula	Value
	Base Exchange Rate		
L1	Current		**62**
L2	Proposed		**65**
	Jamaica Inflation Index[3]		
L3	CPI @ Feb 2006		**2295.1**
L4	CPI @ Feb 2005		**2041.7**
	US Inflation Index[3]		
L5	CPI @ Feb 2005		**198.7**
L6	CPI @ Feb 2004		**191.8**
L7	Exchange Rate Factor	(L2-L1)/L1	**4.84%**
L8	Jamaican Inflation Factor	(L3-L4)/L4	**12.41%**
L9	US Inflation Factor	(L5-L6)/L6	**3.60%**
	Escalation Factor	0.76*L7*(1+0.922*L9)+0.76*0.922*L9+0.24*L8	**9.30%**

1.3 Application of the Annual Inflation Adjustment Factor (dI)

Based on Table 1.1 above, an annual adjustment factor of 9.3% can be applied to the total tariff basket. The adjustment in each tariff will be weighted, thus the adjustment across rates will be dependent on their relative weights in relation to the total tariff basket. The tariff basket, shown in Table 1.2 below, is derived using the 2005 billing determinants and the appropriate non-fuel tariffs for 2005 (see Table 1.6 for the 2005 tariffs)[4].

Table 1.2

Total Non-Fuel Tariff Basket

Class		Block/ Rate Option	Customer Charge Revenue (J$'000)	Energy Revenue (J$'000)	Demand (KVA) Revenue (J$'000)				Total Demand Revenue (J$'000)	Total Revenues (J$'000)
					Std.	Off-Peak	Part-Peak	On-Peak		
Rate 10	LV	0-100 kWh	12,125	1,830,298						1,842,423
Rate 10	LV	> 100 kWh	22,577	5,999,306						6,021,883
Rate 20	LV		8,904	4,551,927						4,560,831
Rate 40A	LV		945	295,440	117,704				117,704	414,089
Rate 40	LV	STD	2,072	939,717	1,334,229				1,334,229	2,276,018
Rate 40	LV	TOU	306	282,742		14,469	151,357	159,149	324,975	608,023
Rate 50	MV	STD	142	406,649	519,855				519,855	926,646
Rate 50	MV	TOU	60	186,693		12,989	124,856	113,593	251,438	438,191
Rate 60	LV		118	567,997						568,115
Total			47,249	15,060,769	1,971,788	27,458	276,213	272,742	2,548,201	17,656,219

[3] See Appendix I for details of CPI indices.
[4] The 2005 Tariffs mentioned here are the 2004 tariffs inflated by the 2005 adjustment factor of 6.43%.

1.3 Application of the Annual Inflation Adjustment Factor (dI) (Cont'd)

The weights of each tariff, relative to the total tariff basket shown in Table 1.2, are shown in Table 1.3 below.

Table 1.3

Non-Fuel Tariff Basket Weights

Class	Block/ Rate Option	Customer Charge	Energy	Demand				Total
				Std.	Off-Peak	Part-Peak	On-Peak	
Rate 10	0-100 kWh	0.1%	10.4%	0.0%	0.0%	0.0%	0.0%	10.5%
Rate 10	>100 kWh	0.1%	34.0%	0.0%	0.0%	0.0%	0.0%	34.1%
Rate 20	LV	0.0%	25.8%	0.0%	0.0%	0.0%	0.0%	25.8%
Rate 40A	LV	0.0%	1.7%	0.6%	0.0%	0.0%	0.0%	2.3%
Rate 40	LV - Std	0.0%	5.3%	7.6%	0.0%	0.0%	0.0%	12.9%
Rate 40	LV - TOU	0.0%	1.5%	0.0%	0.1%	0.9%	0.9%	3.4%
Rate 50	MV - Std	0.0%	2.3%	2.9%	0.0%	0.0%	0.0%	5.2%
Rate 50	MV - TOU	0.0%	1.1%	0.0%	0.1%	0.7%	0.6%	2.5%
Rate 60	LV	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	3.2%
Total		0.2%	85.3%	11.2%	0.2%	1.6%	1.5%	100.0%

Table 1.4 below shows the annual adjustment factor that JPS proposes to apply to each individual tariff, prior to the application of the Q, X and Z adjustment factors.

Table 1.4

Annual Non-Fuel Inflation Adjustment per tariff (dI only)

Class	Block/ Rate Option	Customer Charge (J$/kWh)	Energy (J$/kWh)	Demand (J$/KVA)			
				Std.	Off-Peak	Part-Peak	On-Peak
Rate 10	0-100 kWh	10.0%	9.297%				
Rate 10	>100 kWh	10.0%	9.297%				
Rate 20	LV	10.0%	9.297%				
Rate 40A	LV	10.0%	9.297%				
Rate 40	LV - Std	10.0%	9.297%	9.297%			
Rate 40	LV - TOU	10.0%	9.297%		9.297%	9.297%	9.297%
Rate 50	MV - Std	10.0%	9.297%	9.297%			
Rate 50	MV - TOU	10.0%	9.297%		9.297%	9.297%	9.297%
Rate 60	STREET-LIGHTS	10.0%	9.297%				
Rate 60	TRAFFIC-LIGHTS	10.0%	9.297%				

1.3 Application of the Annual Inflation Adjustment Factor (dI) (Cont'd)

The appropriate non-fuel base rates approved in the 2005 Annual Tariff Adjustment are shown in Table 1.5 below[5].

Table 1.5

Approved Non-Fuel Tariffs for 2005

Class		Block/ Rate Option	Customer Charge J$/ kWh	Energy J$/kWh	Demand J$/KVA			
					Std.	Off-Peak	Part-Peak	On-Peak
Rate 10	LV	0-100 kWh	71	4.751				
Rate 10	LV	>100 kWh	71	8.363				
Rate 20	LV		163	7.341				
Rate 40A	LV		2,260	4.574	297			
Rate 40	LV - Std		2,260	1.860	761			
Rate 40	LV - TOU		2,260	1.860		31	331	424
Rate 50	MV - Std		2,260	1.674	684			
Rate 50	MV - TOU		2,260	1.674		28	298	382
Rate 60	STREET-LIGHTS		592	8.782				
Rate 60	TRAFFIC-LIGHTS		592	5.847				

Table 1.6 below shows the proposed inflation adjusted rates after applying the individual tariff increases as proposed previously in Table 1.4. Essentially, this captures the 2006/7 inflationary factor (dI) for the non-fuel electricity tariffs of 9.3%, prior to the application of the X, Q and Z factors.

1.4 Application of the Annual Inflation Adjustment Factor (dI - X)

Schedule 3 Exhibit 1 of the Licence defines the X-factor as follows:

> "The X-factor is based on the expected productivity gains of the Licensee's Business. The X-factor is to be set to equal the difference in the expected total factor productivity growth of the Licensed Business and the general total factor productivity growth of firms whose price index of outputs reflect the escalation measure 'dI'."

In the June 25, 2004 Determination Notice by the OUR, the X-factor was determined to be 2.72%, being a reduction to the annual inflation adjustment to be applied as of 2006. Accordingly, the annual adjustment factor for 2006/7 which reflects dI – X would be 6.58%.

Table 1.6 below shows how JPS proposes to apply the annual adjustment factor of 6.58% to the individual tariffs, which is subject to a small level of tariff rebalancing.

[5] The 2005 Tariffs mentioned here are the 2004 tariffs inflated by the 2005 adjustment factor of 6.43%. This differs from the actual 2005 tariffs which were approved as these had to be escalated by 20% to take into consideration the two month delay in implementing the 2005 tariff increase.

1.4 Application of the Annual Inflation Adjustment Factor (dI - X) (Cont'd)

Table 1.6

Annual Non-Fuel Inflation Adjustment per tariff, net of X (dI - X)

Class	Block/ Rate Option	Customer Charge (J$/kWh)	Energy (J$/kWh)	Demand (J$/KVA)			
				Std.	Off-Peak	Part-Peak	On-Peak
Rate 10	0-100 kWh	10.0%	6.57%				
Rate 10	>100 kWh	10.0%	6.57%				
Rate 20	LV	10.0%	6.57%				
Rate 40A	LV	10.0%	6.57%				
Rate 40	LV - Std	10.0%	6.57%	6.57%			
Rate 40	LV - TOU	10.0%	6.57%		6.57%	6.57%	6.57%
Rate 50	MV - Std	10.0%	6.57%	6.57%			
Rate 50	MV - TOU	10.0%	6.57%		6.57%	6.57%	6.57%
Rate 60	STREET-LIGHTS	10.0%	6.57%				
Rate 60	TRAFFIC-LIGHTS	10.0%	6.57%				

As per the June 2004 OUR determination, the weighted annual adjustment factor proposed by JPS should equate to the annual adjustment factor (6.58%). Proof of this is shown in table 1.7 below.

Table 1.7

Weighted Non-Fuel Inflation Adjustment (dI - X)

Class	Block/ Rate Option	Customer Charge (J$/kWh)	Energy (J$/kWh)	Demand (J$/KVA)				Total
				Std.	Off-Peak	Part Peak	On-Peak	
Rate 10	0-100 kWh	0.01%	0.68%					0.69%
Rate 10	>100 kWh	0.01%	2.24%					2.25%
Rate 20	LV	0.01%	1.69%					1.70%
Rate 40A	LV	0.00%	0.11%	0.04%				0.15%
Rate 40	LV - Std	0.00%	0.35%	0.50%				0.85%
Rate 40	LV - TOU	0.00%	0.11%	0.00%	0.01%	0.05%	0.05%	0.22%
Rate 50	MV - Std	0.00%	0.15%	0.19%	0.00%	0.00%	0.00%	0.34%
Rate 50	MV - TOU	0.00%	0.07%	0.00%	0.00%	0.05%	0.05%	0.17%
Rate 60	LV	0.00%	0.21%					0.21%
Total		0.03%	5.61%	0.73%	0.01%	0.10%	0.10%	**6.58%**

It is worth noting that 3.8% of the 6.58% increase proposed to the non-fuel tariffs is the result of resetting the base exchange rate from 62:1 to 65:1 (refer to Table 1.1). Accordingly, the real in increase in non-fuel tariffs would be 2.78%. Additionally, given current fuel prices, which account for approximately 55% of customers' total bills, the total bill impact from this increase is expected to be approximately 1.25%.

Table 1.8 below shows the proposed rates after application of both the inflation factor (dI) and the X-factor.

1.4 Application of the Annual Inflation Adjustment Factor (dI - X) (Cont'd)

Table 1.8

Inflation and X-Factor Adjusted Rates (dI - X)

Class		Block/ Rate Option	Customer Charge J$/ kWh	Energy J$/kWh	Demand J$/KVA			
					Std.	Off-Peak	Part-Peak	On-Peak
Rate 10	LV	0-100 kWh	78	5.063				
Rate 10	LV	>100 kWh	78	8.912				
Rate 20	LV		179	7.823				
Rate 40A	LV		2,486	4.874	317			
Rate 40	LV - Std		2,486	1.982	811			
Rate 40	LV - TOU		2,486	1.982		33	353	452
Rate 50	MV - Std		2,486	1.784	729			
Rate 50	MV - TOU		2,486	1.784		30	318	407
Rate 60	STREET-LIGHTS		651	9.359				
Rate 60	TRAFFIC-LIGHTS		651	6.301				

1.5 Application of the Z-Factor to the annual adjustment (dI - X + Z)

The final tariff for 2006/2007 would be derived by adjusting the inflation escalated rates shown in Table 1.8 above for the Z-factor. The complete details of the Z-factor adjustment are presented in Section 2 of this document. Section 2.4 demonstrates that the total Z-factor impact equates to 5.9¢ per kWh which may be applied to the energy charge only[6]. Accordingly, the full impact of the annual PBRM on non-fuel rates after including the Z-factor recovery in the energy charge is shown in Table 1.9 below.

Table 1.9

Summary of Proposed 2006/2007 Non-Fuel Tariffs (dI - X ± Q + Z)

Class		Block/ Rate Option	Customer Charge J$/ kWh	Energy J$/kWh	Demand J$/KVA			
					Std.	Off-Peak	Part-Peak	On-Peak
Rate 10	LV	0-100 kWh	78	5.122				
Rate 10	LV	>100 kWh	78	8.971				
Rate 20	LV		179	7.882				
Rate 40A	LV		2,486	4.933	317			
Rate 40	LV - Std		2,486	2.041	811			
Rate 40	LV - TOU		2,486	2.041		33	353	452
Rate 50	MV - Std		2,486	1.843	729			
Rate 50	MV - TOU		2,486	1.843		30	318	407
Rate 60	STREET-LIGHTS		651	9.418				
Rate 60	TRAFFIC-LIGHTS		651	6.360				

[6] Please note the alternative recovery methods mentioned in section 2.3.

Section 2: Exogenous Shocks: The Z-Factor

2.1 Background

JPS experienced losses as a result of hurricane storm damage in 2005, resulting from the passage of hurricanes Dennis, Emily and Wilma. The details of the financial impact are provided in section 2.2.

As explained in detail in our 2004 rate submission, JPS is not able to obtain conventional insurance coverage in relation to its T&D assets. As a result, it was agreed with the OUR to start a self-insurance sinking fund effective June 2004 with a view of funding approximately US$2 million per annum. The fund has an accumulated value of approximately US$3.5 million as at March 31, 2006.

In the absence of adequate protection from the self insurance fund and given the nature of the event, JPS is required to file for recovery of the relevant costs under the Z-factor, as defined in Schedule 3 (Exhibit 1) of the Licence:

"The Z-factor is the allowed percentage increase in the price cap index due to events that:

a) affect the Licensee's costs;
b) are not due to the Licensee's managerial decisions; and
c) are not captured by the other elements in the price cap mechanism."

The Z-factor claim, as outlined in detail in section 2.2, relates to hurricane/storm damage suffered by JPS' in 2005. This claim has been quantified based on the total cash flow impact of the hurricane storm damage on the company. This is consistent with section 1.2, of the OUR's June 24, 2004, Determination Notice, where the OUR states:

> "It is therefore the objective of the Office to ensure that the tariff determination will:
>
> - further improve upon customer service and service reliability;
> - provide the correct set of incentives for JPS to operate efficiently and to continue improving its productivity;
> - provide a fair return to investors; and
> - ensure that, while the price cap regime imposes a constraint on the company to pass on excessive costs to the customers, it does not unfairly impose upon the company risks that are outside of managerial control."

It is JPS' fundamental position that the costs included in this claim are the result of risks that are outside of its managerial control; and that JPS operates under a regulatory framework which sets its allowed return on investment and monitors its O&M costs after properly contemplating appropriate operational risks which JPS should address, as well as providing protection in the form of a Z-factor against unavoidable residual risks.

2.2 Z-factor impact on JPS

2.2.1 Financial Considerations

Hurricanes Dennis, Emily and Wilma had numerous effects on the company from a financial and operational viewpoint. In addition to incurring unplanned restoration costs, JPS also experienced reduced levels of energy sales during the months of July and October 2005. This reduction in energy sales has resulted in a fundamental inability to recover fixed embedded costs, which form part of the company's revenue requirement.

2.2.2 Restoration Costs

The hurricane restoration costs have been appropriately disclosed in JPS' 2005 audited financial statements which were reviewed by the independent auditing firm KPMG. The costs reflected in the financial statements relate to incremental costs incurred directly as a result of the hurricane restoration cost. No embedded costs in relation to the revenue requirement (e.g. basic employee salaries) have been included in the hurricane restoration costs, which are shown in Table 2.1 below.

The costs included in the financial statements are based on expenditure appropriately charged to the hurricane storm damage work orders, as appropriately evidenced by duly authorized supporting documentation (e.g. third party invoices for contractor services, duly authorized overtime forms for labour charges and duly authorized materials requisition forms for materials issued from inventories). KPMG reviewed this expenditure as a part of the overall statutory audit to ensure that the expenditure incurred was properly authorized and appropriately classified. A summary of these incremental costs are noted in Tables 2.1 and 2.2 below:

Table 2.1 Hurricane Storm Damage by storm system

	J$'000s
Dennis	37,805
Emily	26,109
Wilma	22,916
TOTAL	**86,830**

Table 2.2 Hurricane Storm Damage by Functional Divisions

	J$'000s
Generation	1,141
Transmission	5,180
Distribution	81,030
TOTAL	**86,830**

The complete details of the restoration costs incurred by Parish and by major expense classification are included in Appendix III.

2.2 Z-factor impact on JPS (Cont'd)

2.2.3 Revenue Impairment

An adjustment to recover appropriate losses in relation to non-fuel revenues is also considered prudent as JPS has lost the ability to recover appropriately approved operating costs which form part of the OUR-approved non-fuel revenue requirement. This is of extreme importance, given that JPS has significant operating costs embedded in its approved revenue requirement which do not reduce with sales, notably, payroll, depreciation and financing costs (to highlight a few), and the recovery of the revenue requirement represents JPS' basic ability to pay for such approved operating costs. Therefore, JPS' approach to the Z-factor claim is to:

(i) claim for all appropriately incurred incremental costs (i.e. costs associated directly with the hurricane restoration effort) and to exclude all fully embedded costs (e.g. regular salaries for employees); and

(ii) claim for appropriate embedded costs in the non-fuel revenue requirement that were under-recovered in the energy sales (i.e. sales lost as a result of the hurricane and related inclement weather). Accordingly, revenues which are fixed (or less variable in nature) are appropriately excluded from this calculation (e.g. customer charges, demand charges and IPP charges).

While JPS is fully cognizant of the risk which it faces in meeting the regulatory approved sales forecast (and subsequent sales growth thereafter), it does not believe that it should be penalised for energy sales that are not realised as a direct result of hurricane storm damage. As it relates to the energy sales performance, a review of energy sales in the quarter prior to the hurricane reveals that JPS had achieved the regulatory sales target as it relates to the hurricanes experienced in July 2005 as shown in Table 2.3 below.

Table 2.3

Comparison of actual sales in Q2'05 vs. Forecast sales

	Apr-05	May-05	Jun-05	TOTAL
Actual sales	262,209	260,038	263,384	785,631
Total forecast sales (Kwh) for the 3 month period				779,203
Actual sales excess over target				0.8%

Accordingly, all sales shortfall experienced in July 2005 relative to the sales forecast is deemed to be the result of the hurricanes, as shown in Table 2.4.

In the case of Hurricane Wilma in October 2005, a similar review of the energy sales for the quarter ended September 2005 (i.e. the quarter prior to the event) revealed that sales were 2.4% below forecast (see bottom of Table 2.5). Accordingly, the actual billed energy sales (kWh) for October 2005 was grossed up for this identified deficiency before comparing this deemed sales to the sales forecast to determine the sales shortfall attributable to the hurricane.

2.2 Z-factor impact on JPS (Cont'd)

2.2.3 Revenue Impairment (Continued)

Based on the actual billed energy sales for the month of July 2005 (the period affected by hurricanes Dennis and Emily) the value of the operating costs embedded in the non-fuel revenue requirement which were under-recovered was $48.8 million as calculated in Table 2.4 below.

Table 2.4

Non-fuel revenues lost to Hurricanes Dennis & Emily

			J$000's
2004 Approved revenue requirement			17,298,260
Less:	- IPP costs		(3,002,542)
	- Sinking fund		(122,000)
Adjusted revenue requirement			$14,173,718

2005 Billing determinants	
Energy charge	85.15%
Customer charge	0.27%
Demand charge	14.58%
	100.00%

	J$000's
Adjusted revenue requirement for energy charge only (85.15%)	$12,069,375
Forecast sales- kWh (Jun'04 to May'05)	3,075,800
Average energy rate per kWh (Jun'04 to May'05)	$3.92
Approved annual inflation Jun'05	6.43%
Average energy rate per kWh (Jun'05 to May'06)	$4.18
Billed sales Jul'05 (kWh)	254,881
Forecast sales for Jul'05 (kWh)	266,569
Deemed sales short-fall (kWh)	11,688
Estimated Short-fall	$48,814

Comparison of actual sales in Q2'05 vs. Forecast sales

	Apr-05	May-05	Jun-05	TOTAL
Actual sales	262,209	260,038	263,384	785,631
Total forecast sales (kWh) for the 3 month period				779,203
Actual sales excess over target				0.8%

Please note that the sales forecast shown above for the quarter ended June 2005 is the regulatory approved sales forecast of 3,075,800 kWh for 2004/5 appropriately adjusted for an assumed sales growth of 4% as of June 2005.

Additionally, based on the actual billed energy sales for the month of October 2005, as appropriately adjusted for the estimated 2.4% sales deficiency, the value of the operating costs embedded in the non-fuel revenue requirement which were under-recovered as a result of hurricane Wilma was $24.5 million as calculated in Table 2.5 below.

2.2.3 Revenue Impairment (Continued)

Table 2.5

Non-fuel revenues lost to Hurricane Wilma

	J$000's
Adjusted revenue requirement for energy charge only (85.15%)	$12,069,375
Forecast sales- kWh (Jun'04 to May'05)	3,075,800
Average energy rate per kWh (Jun'04 to May'05)	$3.92
Approved annual inflation Jun'05	6.43%
Average energy rate per kWh (Jun'05 to May'06)	$4.18
Billed sales Oct '05 (kWh)	254,692
Billed sales Oct '05 grossed up for 2.4% deficiency	260,697
Forecast sales for Oct'05 (kWh)	266,569
Deemed sales short-fall (kWh)	5,872
Estimated Short-fall	$24,525

Comparison of actual sales in Q3'05 vs. Forecast sales

	Jul-05	**Aug-05**	**Sep-05**	**TOTAL**
Actual sales	254,881	254,330	259,954	780,853
Jul'05 shortfall	11,688	*		
Total forecast sales (kWh) for the 3 month period =				799,708
Deemed sales short-fall prior to hurricane Wilma				-2.4%

* The deemed short-fall for Jul'05 due to hurricanes Dennis & Emily has been included above to establish the normalized sales trend in the quarter prior to hurricane Wilma.

The embedded non-fuel costs shown in the two tables above are based on the OUR-approved revenue requirement for 2004, adjusted to:

(i) exclude costs that are not considered appropriate for these purposes; and

(ii) reflect the annual tariff increase granted in 2005.

The costs excluded relate to the revenue requirement for IPP costs, sinking fund costs and the revenue components associated with the demand charge and customer charge. These items have been excluded for the following reasons:

(i) There can be no under-recovery of IPP costs due to the IPP surcharge methodology;

(ii) there is not likely to be any notable under-recovery on the demand charge because of lower than planned energy sales, due to the nature of the demand charge;

(iii) there is not likely to be any notable under-recovery in customer charges; and

(iv) there is no necessity to recoup the sinking fund component of the revenue requirement lost to lower than planned energy sales.

2.2.4 Opportunity Cost of Capital

The Z-factor impacts the company's working capital in two ways. Firstly, in terms of the additional expenditure incurred of $86.8 million; and secondly, in terms of the unavoidable revenue losses of $73.3 million (i.e. the inability to recover approved embedded costs), making the total cash impact on the company $160.1 million.

This cash impact has an opportunity cost of capital which JPS believes should be measured at the rate of 14.85% net, being the OUR-approved return on investment rate. This represents the appropriate discount rate for the shareholders of the company.

Assuming that all cash impact was experienced at the end of 2005, and further that the recovery will occur over a twelve month period from July 2006 to June 2007, would yield an average recovery period of eleven (11) months. So, on the basis of the total cost being $160.1 million, the applicable carrying rate being 14.85% and taxes of 33 1/3%, and an average recovery period of eleven months, the carrying cost incurred by JPS would equate to $32.7 million.

2.3 Proposed recovery options

2.3.1 Recovery from the sinking fund

Given the relatively small amount of hurricane storm damage in 2005, one option of recovery could be directly from the sinking fund reserve. This method would result in a faster recovery period and accordingly a reduction to the opportunity cost of capital from $32.7 to $17.8 million. This method is considered attractive given its simplicity, the relatively small size of the 2005 claim, the large size of the pending 2005 claim and given the potential for significant hurricane damage in 2006. This option would help to reduce the increase in the non-fuel rates as a result of inflation, and pending the outcome of the decision on the 2005 Z-factor claim which clearly will have to be recovered through energy rates given the amount in question.

2.3.2 Recovery through the non-fuel base rates

The Z-factor claim may also be recovered through non-fuel tariffs in a manner similar to the current treatment for IPP costs (as per page 14 of the OUR's Determination Notice). This methodology would require that:

- The Z-factor claim is embedded in the non-fuel energy charge only;
- The actual energy rate per kWh will be derived based on forecast sales for the twelve month period June 1, 2006 to May 31, 2007 of 3,245,000 kWh;
- The amount to be recovered will be based on a Base Exchange Rate and appropriately adjusted for foreign currency movements;
- A monthly computation would be done similar to the IPP surcharge, where any under or over recovery is adjusted through the fuel rate each month; and
- A Reconciliation would be done at the end of the twelve-month period to show that JPS has adequately recovered its costs through the embedded energy rate and refunded or recovered the difference, if any, through the monthly fuel rates.

2.3 Proposed recovery options (Cont'd)

2.3.2 Recovery through the non-fuel base rates (Continued)

The following matters are considered crucial to the above mentioned recovery process:

- JPS wishes to ensure recovery of the agreed Z-factor claim and wishes to avoid the potential for any over or under recovery;
- JPS does not believe this financial claim should be subject to sales risk, especially considering the complication which could ensue should another catastrophe result in the actual energy sales during the recovery period being lower than the forecast;
- Considering that the opportunity cost of capital is embedded in the Z-factor claim, and given the importance of the predictability of future recovery, JPS considers it critical that this claim be recovered as close as possible to the forecast period. It is for this reason that a monthly measure is desired; and
- JPS believes that this methodology would be relatively simple and effective to implement, given the current treatment of the monthly IPP surcharge.

2.3.3 Interim recovery of the 2005 Z-factor claim

Having regard to the pending dispute over the 2004 Z-factor claim, in the event that it is determined by the OUR that any of the claims as set out at in section 2.2 above are not recoverable in full or in part, JPS asks the OUR to make a determination that JPS be allowed to effect recovery of any item determined recoverable in full or in part as soon as reasonably practicable after the determination and in a manner agreed with the OUR.

Additionally, JPS requests a determination that the recovery of any sum, in accordance with our request in the paragraph above, be effected without prejudice to the company's right of appeal against any determination(s) that any item of the claim or any portion thereof, as set out at in section 2.2, is not recoverable by JPS.

This request is made to prevent undue accumulation of any Z-factor claim amounts. Any delay in recovery would contribute towards a higher level of rate increase in the future, especially having regard to the recovery of the pending 2004 Z-factor claim.

In accordance with the foregoing, JPS has provided a pro forma adjustment in Table 2.6 to its current Z-factor claim of $191.8M. These pro forma adjustments are made based on the guidance provided by the OUR in its 2004 ruling and subsequent letter (dated September 9, 2005) provided to JPS. In relation to the 2004 Z-factor claim the OUR argued as follows:

- The OUR was of the opinion that the recovery of revenue losses was inappropriate;
- The OUR disagreed with the inclusion of claims in relation to generation assets;
- The OUR was of the opinion that there were enhancement costs to the system which should be treated as capital improvements and deferred for recovery until the 2009 rate case review; and
- The OUR agreed to the principal of the opportunity cost of capital.

Applying the OUR principals above, the JPS claim could be adjusted as follows:

2.3 Proposed recovery options (Cont'd)

2.3.3 Interim recovery of the 2005 Z-factor claim (Continued)

Table 2.6

Pro forma Adjustments to JPS' Z-factor claim based on OUR principals

{Amounts in J$ millions}	J$M
Total claim per JPS	192.8
Adjustments to exclude:	
- Lost revenues	(73.3)
- Damage to Generation assets	(1.1)
- Enhancement costs (see Table 2.7)	(29.2)
- Opportunity cost of Capital per JPS	(32.7)
	56.5
Adjustments to include:	
- OUR agreed Opportunity cost of capital	7.1
Undisputed portion of claim	63.6

Table 2.7

Pro forma determination of Enhancement Cost based on OUR principals

	Allowed Cost ($'000)	Dep'n Factor (%)	Enhancement Cost ($'000)	Restoration Cost ($'000)
Payroll & Wage costs	13,610	0	0	13,610
Labour Expense	3,431	0	0	3,431
Third Party Contractors	17,471	33	5,765	11,705
Sub-stations		15	0	0
Material & Equipment	46,767	50	23,383	23,383
Office Expenses	148	0	0	148
Build. & Misc. Expenses	521	0	0	521
Transportation expenses	214	0	0	214
Total	**82,161**		**29,149**	**53,012**

Table 2.8

Pro forma determination of Opportunity Cost of Capital based on OUR principals

Period	Principal ($000's)	Interest Rate (%)	Duration (Months)	Opportunity Cost ($000's)	Payment Method
Nov. 2005 –May 2006	53,012	11.38	7	3,519	Single Bullet
Jun. 2005 –May 2007	56,531	11.38	12	3,545	Reducing Balance
Total				**7,064**	

2.3 Proposed recovery options (Cont'd)

2.3.3 Interim recovery of the 2005 Z-factor claim (Continued)

Again, following the principals outline in section 2.3.1, if the undisputed portion of the claim were recovered from the sinking fund reserve, and not from energy rates, then the opportunity cost of capital could be further reduced by $3.545 million (see Table 2.8) since the full amount could be recovered in June 2006.

2.4 Application of Z-factor to energy rates

Should the OUR determine that the Z-factor should be recovered from energy rates and not from the sinking fund, then JPS proposes that the Z-factor adjustment be recovered through energy charges only and from all the billing determinants. We believe that this is both appropriate and equitable, especially given that the demand charge would present an undesirable mode of recovery, considering the nature of the demand charge. The commercial customers facing the demand charge did not see a reduction in this billing determinant during the hurricane periods, so it would be inappropriate to now increase their demand charge as a result of the hurricane in the application of the Z-factor to rates.

The total impact of the hurricane includes the incremental hurricane restoration costs, the under-recovered embedded costs in the non-fuel revenue requirement and the opportunity cost of capital. The embedded energy rate would be derived by dividing the total hurricane cost of $186.8 million by the forecast sales of 3,245,000 kWh, producing a Z-factor adjustment of 5.9¢ per kWh, as shown below:

$$ER = \frac{J\$191.8M}{3{,}245{,}000} = 5.9¢ \text{ per kWh}$$

Where:

ER = embedded Z-factor rate denoted in Jamaican cents.

$178.4 million = total hurricane impact for 2005.

3,245,000 = total forecast kWh sales for the period June 2006-May 2007.

JPS expects to recover the total Z-factor cost evenly over the twelve-month period. However, depending on the actual billed sales, JPS may over or under recover the Z-factor cost for any given month, or in total over the recovery period. This potential over- or under recovery could be avoided by applying the following monthly adjustment mechanism:

$$\text{Over/(Under) Recovery} = \left(\text{BS1} - \frac{3{,}245{,}000}{12}\right) X \ \frac{5.9¢}{65} \text{ X BFX1}$$

2.4 Application of Z-factor to energy rates (Cont'd)

Where:

BS1 = the actual billed sales in a given month (denoted in kWh).

3,245,000 = total forecast kWh sales for the period June 2005-May 2006.

65 = the base foreign exchange rate during the recovery period.

BFX1 = the actual billing foreign exchange rate in a given month

JPS proposes that this over/(under) recovery be adjusted for in the monthly fuel and IPP surcharge, that is, any over/(under) recovered amount is subtracted/added to the fuel and IPP cost in the following month when computing the fuel and IPP rate. This would ensure that JPS remains revenue neutral with respect to the recovery of the Z-factor cost, avoids any potential over/under recovery and recovers the cost over the agreed time-line having regard for the time value of money.

Alternatively, following the principals outlined in section 2.3.3, we can see that the pro forma calculation would yield a recovery rate of 1.96¢ per kWh based adjusted Z-factor claim amount of $63.6 million, as shown below:

$$ER = \frac{J\$63.6M}{3,245,000} = 1.96¢ \text{ per kWh}$$

This new rate could then be used to update Table 1.9 appropriately, and accordingly, the JPS Z-factor claim amount of 5.9¢ per kWh could be replaced with the pro forma calculation of 1.85¢ per Kwh. If this were done, the final adjusted energy rates for 2006 would appear as shown in Table 2.9 below.

Table 2.9

2006/2007 Non-Fuel Tariffs (dI - X ± Q + Z) - Pro forma basis

Class		Block/ Rate Option	Customer Charge J$/ kWh	Energy J$/kWh	Demand J$/KVA			
					Std.	Off-Peak	Part-Peak	On-Peak
Rate 10	LV	0-100 kWh	78	5.081				
Rate 10	LV	>100 kWh	78	8.931				
Rate 20	LV		179	7.842				
Rate 40A	LV		2,486	4.893	317			
Rate 40	LV - Std		2,486	2.000	811			
Rate 40	LV - TOU		2,486	2.000		33	353	452
Rate 50	MV - Std		2,486	1.803	729			
Rate 50	MV - TOU		2,486	1.803		30	318	407
Rate 60	STREET-LIGHTS		651	9.378				
Rate 60	TRAFFIC-LIGHTS		651	6.320				

Section 3: Ensuring Quality of Service: The Q-Factor

3.1 Introduction

The third element under the PBRM is the Q-factor, i.e., the allowed price adjustment to reflect changes in the quality of service provided to customers. Specifically:

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

JPS recommends that the development of the Q-factor meet the following criteria:

- The Q-factor should provide the proper financial incentive to provide a level of service quality based on the customer's view of the value of that service quality;
- The measurement and calculation of the Q-factor should be straightforward and transparent without undue cost of compliance;
- It should provide fair treatment for factors affecting performance that is outside of JPS' control, such as those due to disruptions by the independent power generators; natural disasters; and other *force majeure* events, as defined under the licence; and
- It should be symmetrical in application, as stipulated in the License, with appropriate caps or limits of effect on rates.

3.2 Proposed performance indicators and methodology

JPS proposes a methodology that determines the benchmark for several quality indices and measures the actual performance against these indices. The aggregate performances of the indices will then be used in a weighted calculation to derive a quality of service factor, Q. The Q Factor, so derived, will then be used as an adjustment factor to PCI at the end of each year of the 5-year rate cap period of the PBRM.

JPS proposes that measurements approximating System Average Interruption Duration Index (SAIDI), the System Average Interruption Frequency Index (SAIFI) and Customer Average Interruption Duration Index (CAIDI) for ***Sustained Interruptions***, as defined in the Institute of Electrical and Electronics Engineers Standard (IEEE Std. 1366, 2001) become the quality measures used to determine JPS' level of service quality. By this definition, Sustained Interruption is any interruption not classified as a momentary event, i.e., any interruption longer than five minutes.

The IEEE Standards definitions for the SAIDI, SAIFI and CAIDI quality of service indices are as follows:

- . *System average interruption frequency index (SAIFI)*—this index is interpreted as the average frequency of sustained interruptions experienced per customer for a given period.

$$\text{SAIFI} = \frac{\text{Total number of affected customers}}{\text{Total number of customers served}}$$

(expressed in number of interruptions per year)

3.2 Proposed performance indicators and methodology (Cont'd)

- *System average interruption duration index (SAIDI)*—this index is interpreted as the average interruption duration experienced per customer for a given period.

$$\text{SAIDI} = \frac{(\Sigma\text{Customer minutes loss})}{\text{Total number of customers served}}$$

(usually expressed in minutes)

- *Customer average interruption duration index (CAIDI)*—this index is interpreted as the average restoration time of the utility per interruption.

$$\text{CAIDI} = \frac{(\Sigma\text{Customer minutes loss})}{\text{Total number of affected customers}}$$

(usually expressed in minutes)

- $\text{CAIDI} = \frac{\text{SAIDI}}{\text{SAIFI}}$ *(expressed in minutes per interruption)*

The value of Q will be based upon actual values of SAIDI, SAIFI and CAIDI for each year of the PBRM as compared to the benchmark. JPS proposes that the benchmarks are set such that, in each year between 2006 - 2008, JPS will be incentivised to continuously improve its performance on SAIDI, SAIFI and CAIDI relative to performance for the year ended December 31, 2005. Specifically:

SAIDI benchmark in year 2006 + t = SAIDI2005 (1 – 0.02t)
SAIFI benchmark in year 2006 + t = SAIFI2005 (1 – 0.02t)
CAIDI benchmark in year 2006 + t = CAIDI2005 (1 – 0.02t)

In other words, SAIDI, SAIFI and CAIDI should be continuously improving by 2%, relative to the 2005 performance level, in each year from 2006 to 2008. The targets are shown below in Table 3.1.

Table 3.1: JPS Proposed Targets for the Q-factor 2005 – 2009

Year	Target SAIDI	Target SAIFI	Target CAIDI
2006	SAIDI2005	SAIFI2005	CAIDI2005
2007	SAIDI2005 (1 – 0.02)	SAIFI2005 (1 – 0.02)	CAIDI2005 (1 – 0.02)
2008	SAIDI2005 (1 – 0.04)	SAIFI2005 (1 – 0.04)	CAIDI2005 (1 – 0.04)

In each of the three years following 2005:

- If the SAIDI, SAIFI and CAIDI calculations show marked improvement relative to the target, Q will be a fixed positive adder to the annual PBRM filing.
- If the SAIDI, SAIFI and CAIDI calculations show little or no change relative to the target, Q will be zero (a dead band).

3.2 Proposed performance indicators and methodology (Cont'd)

- If SAIDI, SAIFI and CAIDI calculations show deterioration relative to the target, Q will be a fixed negative reducer to the annual PBRM filing.

As noted above, JPS' performance on SAIDI, SAIFI and CAIDI in 2005 will form the basis on which benchmarks for Q are set in the future years. Calculation of these three indices require data on:

- Outage start and end times;
- System total number of customers; and
- Number of customers affected by the outage.

JPS has Systems in place as described in section 3.5 to collect the data required for the computation of SAIDI, SAIFI and CAIDI for planned and forced outages at both the feeder and sub-feeder level.

3.3 JPS 2005 performance on SAIDI, SAIFI and CAIDI

Preamble to the results

When JPS put forward its tariff submission in June 1, 2004, the system to capture the information on forced outages at the sub-feeder level was not yet in place. As a result, the OUR decided that the Q-factor would remain at zero until June 2005 when the data on forced outages at both the feeder and sub-feeder levels should have been collected, audited and analyzed by the OUR.

The proposal submitted was to set the baseline for JPS' performance on one-year's data from June 2004 to June 2005. JPS implemented the system in June and data capture for computation of SAIDI, SAIFI and CAIDI on forced outages at the sub-feeder level began in July 2004. As a result of the above, and the *Force Majeure* period September 10 – October 31 due to hurricane Ivan, one year's data was not available at the time of the last annual submission in March 2005. The OUR subsequently delayed the implementation of the Q-factor adjustment to the 2005/6 tarrifs.

Finally, having regard to the timing of the annual submission (i.e. March of each year) and the need to compile the Q data, JPS proposes that going forward it would be more practical to submit the annual performance data on a calendar year basis. Accordingly, JPS has resubmitted the actual indices for the calendar year 2005 to be utilized to establish the base line performance data set.

Table 3.2 below shows JPS' performance on SAIDI, SAIFI and CAIDI for 2005 (January – December) for sustained interruptions (i.e. interruptions longer than five minutes).

3.3 JPS 2005 performance on SAIDI, SAIFI and CAIDI (Cont'd)

Table 3.2: JPS 2005 performance on SAIDI, SAIFI and CAIDI

JPS Outage Data

Month	***SAIDI***	***SAIFI***	***CAIDI***
January	*151.79*	*1.82*	*83.20*
February	*117.57*	*1.73*	*67.85*
March	*257.26*	*2.49*	*103.42*
April	*207.02*	*2.72*	*76.16*
May	*311.18*	*3.73*	*83.47*
June	*521.32*	*6.16*	*84.60*
July	*480.03*	*3.92*	*122.57*
August	*305.61*	*3.70*	*82.58*
September	*306.31*	*3.13*	*97.76*
October	*390.07*	*3.42*	*113.91*
November	*256.33*	*2.27*	*112.69*
December	*123.23*	*1.55*	*79.51*
Grand Total	***3,427.73***	***36.65***	***93.52***

3.4 Q-Factor Method of Calculation

JPS proposes that the quality of service performance should be classified into three categories, with the following point system

- Above Average Performance—would be worth 3 Quality Points for each index;
- Dead Band Performance—would be worth 0 Quality Point for each index; and
- Below Average Performance—would be worth -3 Quality Points for each index.

Table 3.4 Proposed categories and points for SAIFI, SAIDI and CAIDI

Band	**Performance relative to target**	**Quality points**
Above average	Beating the target by 2.0% or greater	3
Dead band	actual performance within –2% and +2% of target	0
Below average	Worsening of performance more than –2%	-3

JPS further proposes that if the sum of Quality Points for:

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

Since the performance in each of the three performance measures can either be above target, below target or on target there are twenty-five possible outcomes as shown below:

3.4 Q-Factor Method of Calculation (Cont'd)

Table 3.3 Possible Q-factor scores

SAIDI	SAIFI	CAIDI	TOTAL	ADJUSTMENT FACTOR
3	3	3	9	0.50%
3	3	0	6	0.40%
3	0	3	6	0.40%
0	3	3	6	0.40%
3	0	0	3	0.25%
0	0	3	3	0.25%
0	3	0	3	0.25%
3	3	-3	3	0.25%
-3	3	3	3	0.25%
3	-3	3	3	0.25%
0	0	0	0	0.00%
3	0	-3	0	0.00%
-3	3	0	0	0.00%
0	-3	3	0	0.00%
-3	0	3	0	0.00%
0	0	-3	-3	-0.25%
0	-3	0	-3	-0.25%
-3	0	0	-3	-0.25%
3	-3	-3	-3	-0.25%
-3	-3	3	-3	-0.25%
-3	3	-3	-3	-0.25%
-3	0	-3	-6	-0.40%
0	-3	-3	-6	-0.40%
-3	-3	0	-6	-0.40%
-3	-3	-3	-9	-0.50%

The proposed Q-factor adjustment methodology is symmetrical and provides equal opportunity for either a positive or negative adjustment to the PBRM.

JPS recommends that the upper limit of the adjustment should be capped at ±0.5% for the 2005−2009 period for the following reasons:

- until a reasonable trend in the Q data set can be observed. JPS has observed that in other jurisdictions that such data is typically collected for a three year period[7];
- given the continuous improvement to the target data, and the knowledge that the target is derived from base line data with some known imperfections, and given the proposed improvement to the data collection process in future noted in section 3.6;
- a detailed cost benefit analysis has not been conducted to determine the cost required to obtain a given level of improvement in the quality of service versus the consumer's willingness to pay for different levels of service quality. This should be the objective basis for determining the limits of any penalty/reward adjustment; and
- the Q Factor acts complimentary to other existing quality assurance measures such as the guaranteed standards to ensure overall quality to the customers. .

JPS believes that this combination of adjustments is reasonable to both JPS and its customers given the points mentioned above and with the knowledge of the planned changes to the measurement basis in 2009. JPS believes it is imperative that the established basis must be objective and well founded if it is to serve its primary purpose of incentivising the company to improve its quality of service.

[7] Service Quality Regulation for Ontario Electricity Distribution Companies: A Discussion Paper; Ontario Energy Board staff, September 15, 2003

3.5 Data Collection, Security and Storage

As noted above, for the calculation of SAIDI, SAIFI and CAIDI indices, the key information to be collected is as follows:

- Outage start and end times;
- System total number of customers; and
- Number of customers affected by the outage.

The data required for calculating approximate SAIDI, SAIFI and CAIDI values will build upon JPS' existing data acquisition capabilities together with JPS' best approximation of the number of customers on each feeder, as described in more detail below.

JPS electronic data capture mechanisms are at various stages of development and no one system exists currently to capture all information required for an exact calculation of the SAIDI, SAIFI and CAIDI indices. SCADA status and analogue information are available on the majority of transmission and generation equipment with status information available for 88% of feeder level circuits. Customer reported data, primarily related to sub-feeder level events, is manually captured and stored electronically using the Call Centre Management System (CCMS).

3.5.1 Data on outage start and end times

Outages can occur at the feeder or sub-feeder level, and can either be planned outages or forced outages. The sources and availability of data required for SAIDI, SAIFI and CAIDI vary depending on the type of outages.

A. Feeder level outages

JPS collects and stores data on all its planned and forced interruptions down to the feeder recloser level in a Microsoft Access-based outage-logging database (developed in-house) located at its System Control Centre. The data collected is stored under unique event codes and includes information related to the equipment affected, the start and end times of the outage, classification of the outage cause, approximate number of customers interrupted, protection devices that operated, etc.

At the feeder recloser level, data will be captured on any forced outage (Generation, T&D). There are three possible sources of outage time data at the feeder level:

- *SCADA system*—where feeder status monitoring via SCADA exists, time of outages will be logged by the System Control Engineer at the System Control Centre utilizing SCADA timestamps. Where available, SCADA will serve as the primary source of outage information at the feeder level.

- *Outage log database*—For planned outage duration at the feeder recloser level, the planned start and end times will be captured and recorded in the outage log database from outage requests submitted by field personnel requesting outages. The System Control Engineer also records the actual start and end times of each planned outage as a normal part of the systems operations protocol.

- *Central call centre logs*—in the event of a SCADA failure, the call centre logs will be used to provide the outage start time, as determined by the first customer call received confirming the feeder outage start time. The outage end time will be determined by the recloser or switch closing time as reported to the System Control Engineer or the Dispatch Technician by the field personnel and also recorded in the call centre log.

3.5.1 Data on outage start and end times (Cont'd)

B. Sub-feeder level outages

- Planned outages—for planned outages at the sub-feeder level, data would be available primarily from the Outage Log Database at the System Control Centre.
- Forced outages—The central call centre logs will be used to provide outage start times. The outage end time will be determined by the recloser or switch closing time as reported to the system control engineer or dispatch technician by the field personnel and also recorded in the call centre log.

3.5.2 System total number of customers

Data regarding the company's total active customer count is captured in the Customer Information System (CIS) billing records. The customer count completed for the end of December 2005 stood at 551,357 and represents the base for 2006 computations. Going forward, JPS proposes to use the customer count at the end of each calendar year for the annual submission, thereby moving the annual performance reporting to a calendar year basis from a March-to-March basis.

3.5.3 Number of customers affected by the outage

A. Feeder level outages

JPS is in the final stages of completing a customer to feeder geographic information system (GIS) mapping project. This activity is being done in stages. The first, which was completed at the end of December 2005, uses global positioning satellite (GPS) co-ordinates to plot each customer to the relevant distribution feeder that provides electricity supply to the customer. The unique CIS customer/premises number is used to identify the customer and location, which is in turn associated with the corresponding plotted GPS co-ordinate.

Where outages (planned and forced) are concerned at the feeder level, it is therefore proposed that the number of customers on each feeder be determined from this customer count listing. This list will be updated at the end of every year to be used in the next years' calculations. See Appendix V for the current customer count list for the year ending December 31, 2005.

B. Sub-feeder level outages

JPS does not currently have customer count data at the sub-feeder level. Therefore, it is proposed that, for sub-feeder section outages, the number of customers affected will be estimated utilizing the feeder peak loading and the average utilization (MW) per customer for that feeder.

3.5.3 Number of customers affected by the outage

B. Sub-feeder level outages (Cont'd)

Feeder peak loadings are determined locally at the substation level from the maximum loading as recorded at the recloser per month. For most feeders, 24-hour substation feeder level measurements exist via electronic substation meters downloaded monthly. For these cases, this loading information will be utilized as the primary source. Utilizing this load reading, and the total number of customers per feeder from the customer count list, an *average utilization* per customer can be computed as follows.

$$\text{Average customer utilization (MW/customer)} = \frac{\text{feeder peak loading per month}}{\text{number of customers on the feeder}}$$

For each planned outage on a feeder section, it is normal that during the submission of outage requests the requesting engineer indicates the number of customers to be affected and/or the load to be interrupted. The load to be interrupted is normally a clip-on reading (amperes) at the switch point done on a similar day to the day of the outage and recorded on the outage request form sent to the System Control Centre. Where the number of customers is not provided and the load to be interrupted is provided, the number of customers on the section can be estimated from the average customer utilization (kW/Customer) for that feeder circuit. Specifically, the estimated kW loadings to be interrupted as determined above will be used along with the average customer utilization for that feeder to determine the number of customers to be interrupted, i.e.:

$$\text{Number of customers to be interrupted} = \frac{\text{Estimated load (kW) interrupted}}{\text{Average Customer Utilization (kW/Customer) for that feeder}}$$

Where neither is provided, the discounted rating of the isolating fuse (amperes) to be opened will be used as a proxy to estimate the load on the line section. The fuse rating is discounted to approximate the typical peak load on the section. This is done based on estimating the load behind the fuse at the sub-feeder level in order to calculate the number of customers affected whenever such fuses operate and interrupt the customer's supply. The fuse that connects a branch is sized (amperes) based on the connected kVA capacity on that branch, i.e. the total capacity of all the transformers on the branch. The transformers are typically loaded to 50 percent of its capacity; this is referred to as the *transformer utilization*. Therefore, in order to determine a factor that can be applied to discount the fuse connecting the branch that represents the load on the segment, the transformer utilization is taken into consideration.

The load on branch = transformer utilization x fuse factor x branch kVA,

Where: (i) the branch kVA = fuse size (amperes) x phase voltage; and

(ii) the fuse factor $= \frac{\text{feeder connected kVA}}{\text{Total main branch fuse kVA}}$

3.5.3 Number of customers affected by the outage (Cont'd)

B. Sub-feeder level outages (Cont'd)

This methodology of determining transformer utilization is normally used to conduct distribution feeders' load flow simulations studies. The above method was also tested with a sample of distribution feeders and the calculated customer count was reconciled to within five to ten percent of the actual customer count for those feeders. For the submission, JPS has used a discount factor of 50 percent to determine the load and the number of customers interrupted for outages at the sub-feeder level.

For each forced outage on the sub-feeder section, the field personnel attending to the restoration will report the size of the fuse (amperes) that interrupted the load and the time of closing to the System Control Engineer or the Dispatch Technician who would enter the information into the Outage Log System. The System Control Engineer then computes an estimate of the number of affected customers based on the methodology that is used in the planned sub-feeder level outage computation mentioned above.

C. Load Transfers

Where there are load transfers, the customer count on any feeder or sub-feeder will differ from the normal count. At the present time, the Outage Log Database at the System Control Centre is manually updated whenever a feeder circuit is fully transferred. The load demand and the number of customers are updated for the feeder to which the load has been transferred. In this way, the number of customers interrupted can be consistently calculated.

A strategy will have to be developed for partial load transfers, which will either be a physical count of customers on the transferred section or a calculation using the load on the section and the Average customer utilization. JPS proposes that the customer count be estimated in the same way as planned outages at the sub-feeder level (i.e. by using the estimated load (kW) transferred and the average kW per customer on that feeder).

$$\text{Number of customers to be transferred} = \frac{\text{Estimated load (kW)}}{\text{Transferred KW per Customer for that feeder}}$$

3.5.4 Data Security

One concern regarding the calculation of any performance measure utilising complex computer systems is data security. JPS believes that adequate measures have been put in place to ensure adequate protection and security of the relevant data. Specifically, the main database system to be utilized to store critical information (outage log database) related to outages operates in a secure environment where a log is kept of all user access and data entry/change. This database is maintained independently by the IS department who are also responsible for ensuring regular back up of the data. Once data is entered, changes can only be made via authorized access. Additionally, the customer count and the feeder loading information are only accessible by the system administrator and the user is only required to enter times, dates, causes for outages etc. Should discrepancies arise in the database, it is possible that validation or crosschecking can be obtained via the other independent data capture mechanisms aforementioned (SCADA, substation metering or the call centre logging system) and also from written logs kept by the operating personnel.

3.6 Benchmark setting and performance measurement 2006 - 2009

In this proposal, JPS has submitted the 2005 Calendar Year performance data for the selected indices (SAIDI, SAIFI and CAIDI). We are proposing that the OUR utilize this information in its determination of the benchmark values for these quality indices for the 2006 Calendar Year. JPS will submit on a monthly basis, one month in arrears, the actual performance of the system with respect to these indices. This actual performance will be determined utilizing the system of data collection described in Section 3.5 above.

At the end of January 2007, JPS will compile and audit the performance data for the calendar year 2006. The fully audited figures will be submitted as part of the annual rate adjustment filing at the end of March 2007. This submitted data should be used along with the previously established benchmark for 2006 to determine the Q Factor adjustment to be applied in the 2007 Tariff Determination.

Planned Improvements in data collection

As mentioned previously, JPS has commenced a geographic information system (GIS) project to establish and maintain a more accurate customer count on each distribution feeder, and in particular, the customer count on each branch circuit. This will result in the GPS mapping of all the customer meters, which will be superimposed on the GIS feeder route and the GPS position of the line switches and fuses will be recorded and mapped in a similar way. This will facilitate the easy counting of all customers on a feeder and sub-feeder basis. A concise database is being created which will incorporate this new customer data into the CIS and the Outage Management System. When this project is completed all reliability indices can be computed using the actual customer count for the affected section of the T&D system.

Basis for resetting the base line data set in 2007

The improvement in the data collection process noted above will enable the recalculation of all 2006 data on an exact customer count basis. However, JPS will not be in a position to recalculate the 2005 data set based on the actual customer count.

A comparison of the 2006 actual performance calculated using the estimated customer count method versus the actual customer count method will provide a basis to re-establish new benchmark data for the quality indices (SAIDI, SAIFI and CAIDI) for 2007, which would be based on the actual customer count method.

These revised benchmarks could then form the basis for future comparison. Should the OUR accepts this proposed approach; JPS could officially switch its determination of the number of customers affected from an estimation to an actual count starting 2007.

If the OUR is averse to resetting the benchmark in 2007 on the above mentioned basis, then JPS proposes that the resetting of the benchmark up to 2009 proceed on the basis outlined in Table 3.1 herein. Likewise, JPS will continue to utilize the estimation routine for comparison against these benchmarks for the remainder of the five year rate cap period. Under this approach, JPS would submit recalculated data based on the actual customer count method to be utilized after 2009. Actual performance would also be measured using this method.