
Jamaica Public Service Company, Limited

Application for Tariff Review 2000

RATE DETERMINATION



OFFICE OF UTILITIES REGULATION

333.793 OUR(589)

Chapter 1

The JPS Tariff Application 2000

1.1 Background

In June 2000 Jamaica Public Service Company (JPS), the monopoly supplier of electricity commercially in Jamaica submitted an application for a tariff review to the Hon. Minister of Mining and Energy, the regulator of electricity services under the legislation now in effect. The company wished to have the new tariffs become effective on 1st September 2000. The Minister requested the Office of Utilities Regulation (OUR) to evaluate the application and to advise him on the appropriate courses of action. During the course of discussions with the OUR, JPS revised its original submission, and the revised proposal is the basis on which this report has been prepared. In its submission the company argued that an increase in tariffs was necessary to:

- (a) ensure that the Company remains financially viable while undertaking the system maintenance and expansion necessary for a reliable service;
- (b) promote the efficient use of electricity by sending the correct price signals to consumers;
- (c) simplify the tariff structure which is critical to customer satisfaction.

The tariff schedule proposed by the company is included as Appendix 3 to this report.

The proposed new tariff schedule not only included new rates which would result in higher prices to the average consumer, but also significantly restructured the bases on which the rates in the individual tariff categories were calculated.

The rates proposed by JPS did not incorporate the effects of the capital restructuring which was a subsequent event. Any comparison of proposed and approved rates should be done with the understanding that the bases are different.

1.2 Proposed Tariff

The JPS application proposes an increase of 9% on the average tariff, which would provide revenues of \$18,631 million and net profits before interest of J\$2,705 million for the test year. The following table shows the expected average tariff for the period.

Table 1-1

Tariffs Proposed in JPS Application

Average Tariff	(J\$/kWh)	6.63
Average Tariff	(US c/kWh)	15.07
Fuel Cost of Sales	(US c/kWh)	5.90
Rate of Return on Assets	%	15.35

Table 1-2 below summarises the current and proposed rates by customer class.

Table 1-2

Rate Category	Current Rate US c/kWh	Proposed	
		Rate US c/kWh	Increase %
Life-Line	14.05	13.70	-2.5
RT10	14.82	17.94	21.0
RT20	14.25	14.07	-1.3
RT40-LV	13.10	13.48	2.9
RT40-MV	13.10	11.26	-14.1
RT50-LV	11.36	12.31	8.4
RT50-MV	11.36	10.44	-8.1
RT60	16.21	18.18	12.1
Average	13.83	15.07	9.0

1.2 General Assumptions

The assumptions on which the proposed changes in tariffs have been developed are shown in Table1-3 below.

Table 1-3

Economic		
Inflation Rate	(%)	6
Exchange Rat	(J\$:US\$)	44.00
Financial		
Average Asset Base 2000/200	(J\$M)	17,625
Depreciation	(J\$M)	1,606
O & M Cost	(J\$M)	4,626
Fuel Cost	(J\$M)	7,294
Purchased Power Cost	(J\$M)	2,861
Market		
Total Sales	(MWh)	2,909,083
Billed Sales	(MWh)	2,809,083
No. of Customers		490,421
Technical		
Net Generation	(MWh)	3,454,537
Heat Rate	(kJ/kWh)	12,976
System Losses	(%)	15.8

1.4 Features of the Tariff

The more important differences between the proposed and existing tariff structures are:

1. Rates for customers in each tariff category have been calculated to reflect the cost of electricity supply to that category. This approach is in keeping with modern principles of tariff determination internationally. However, one of its more problematic effects locally will be that prices to residential customers will be subject to higher percentile increases and higher rates per kWh of consumption than some commercial and industrial categories. In some instances the average commercial and industrial rates will decline. The objective is to eliminate cross-subsidization of residential customers by the commercial and industrial groups, and thereby promote greater economic efficiency.
2. Introduction of an Exclusive Lifeline Residential Rate. The so-called "lifeline rate" is intended to make electricity services available to the economically deprived citizens in the community who would otherwise be able to afford the services only with great sacrifice or not at all. Lifeline rates are lower than the true costs of supply, and must, therefore be subsidised. Therefore, in order to ensure that only those in need gain the benefits of the subsidy, consumption above a certain maximum level per month is

priced at the costs of supply plus a small percentage required to subsidise the lifeline consumers. Currently, the first 100 kWh per month on the bills of all residential customers is charged at the lifeline rate, regardless of what the total consumption level may be. In its application JPS proposes that the ceiling for lifeline rate be kept at 100kWh per month, but that the subsidised rates apply exclusively to customers at or below the 100 kWh per month ceiling. In addition, lifeline consumers will not pay the fuel charge. Residential consumption above 100 kWh per month will be billed at the real costs (including fuel charge) for all units consumed. However, the consumption of some customers may vary above and below the 100 kWh margin from month to month. In order to avoid wide swings in prices per kWh and total bill amounts for customers in such circumstances, JPS proposes that billing must average 100 kWh per month or less for six months before the account will become entitled to the lifeline rate.

3. Unification of the fuel and non-fuel charges in a single energy rate per kWh. For all customer groups (except lifeline) the fuel and energy rates which are currently separately calculated will be combined into a single energy rate. This will supposedly contribute to the simplification of the bill. However, to maintain transparency, the bills will show the unit rates (\$/kWh) for both the fuel and non-fuel elements so that interested customers will be able to see how the single energy rate has been determined.
4. Introduction of a three-period Time-of-Use (TOU) option for Rates 40 and 50. Currently customers on Rates 40 and 50 may choose to be billed according to the time of day at which electricity is consumed, peak or off-peak. Consumption at peak periods is charged at higher rates than at off-peak periods. JPS now proposes that for the billing of customers who choose the TOU option, the day be divided into three periods. It is expected that the change will simplify the choice for some customers for whom accepting the two-period choice would mean too severe disruptions of their operations. The change will provide an incentive to such customers to modify their demand patterns and reduce total demand at system peak.
5. Extension of kilovolt ampere (kVA) demand billing to all large customers (Rates 40 and 50). Currently demand for Rate 50 billing is measured in kVA, while the Rate 40 customers are billed on the basis of maximum kW demand, with a penalty being applied if the power factor falls below a specified limit. The proposed change will rationalise the demand billing process and allow prices to more closely reflect supply costs.
6. Reduction of the Billing Demand Review Interval. At present Rates 40 and 50 customers are billed for power demand at the maximum level attained during the month for which the bill is prepared, or 80% of the highest demand level attained at any time during the previous twelve months. JPS now proposes that the interval over which the maximum demand is assessed, be reduced from twelve to six months. This modification is in line with a growing international trend, and is designed to

7. Creation of sub-groups within Rates 40 and 50 (large customers) in sub-groups based on voltage levels. The voltage level at which supply is taken influences the cost of supply. At lower voltage levels the supply cost is higher because more stages of voltage transformation and longer distribution lines are needed at the lower voltage resulting in greater investment costs and higher technical losses. Operation and maintenance costs are also increased. This new tariff structure reflects this reality by splitting the traditional Rate 40 and 50 classes into two sub-groups, low-voltage (RT40-LV and RT50-LV) and medium voltage (RT40-MV and RT50-MV).
8. Revised discounts for customer-owned transformers. Customers who own their supply transformers, will obtain a flat discount which will depend on the rate classification. This discount has been calculated on the basis of current costs of transformer ownership and maintenance, and is intended to provide greater incentives for private ownership of transformers. The proposed discounts are \$5,093 per month and \$7,822 per month for Rate 40 and Rate 50 respectively
9. Introduction of a Standby Rate classification. In response to demand from customers with privately owned generation facilities, a standby rate is being proposed. In return for a fixed minimum rate, self-generators will now be able to gain access to JPS supplies in the event of shortfalls or interruptions that may result from routine maintenance, emergencies or other contingencies.

1.5 Adjustment Mechanisms

1.51 The Foreign Exchange Adjustment Mechanism

Currently the Gazetted tariff rates are adjusted at each billing period to vary directly with variations in the rate of exchange between the Jamaican dollar and the United States dollar. JPS now proposes that the new rates be adjusted by 75% of the variation in exchange rate (instead of 100%). This will make the tariffs more cost-reflective since currently approximately 75% of the company's costs are specified in foreign exchange and 25% are locally determined.

It is therefore proposed that the Foreign Exchange Adjustment Mechanism be defined as follows:

$$\frac{\text{Exchange Rate at Billing} - \text{Base Exchange Rate}}{\text{Base Exchange Rate}} \times 75 = \% \text{ FE Adjustment Factor.}$$

It is further proposed that the Base Exchange rate be revised to J\$44.00 being equivalent to US\$1.00, in line with the company's budget projections for the 2000/2001 financial year.

1.52 The Fuel Rate Adjustment Mechanism

Currently, the cost of fuel to JPS from the existing supplier is passed through to the consumer, modified only by actual performance against the efficiency targets in fuel efficiency and system losses. In addition, there is also a so-called “dead band” which has the effect of preventing changes in fuel prices being reflected in consumer billing if the fuel price is within the range of 4.57 and 3.60 US cents per kWh. With this system the company has reduced incentives to purchase fuel at lower prices than those obtained from the regular supplier since any savings would be passed on to the consumer. In order to provide greater incentives for the company to obtain fuel at lower cost, it is being proposed that the fuel cost used to calculate the fuel charge to consumers be indexed to movements in the Platts US Gulf reference price, and not to the actual price paid. If the company were able to purchase fuel at costs appreciably below the indexed price it could then gain a financial advantage since the cost from the local supplier would be used to determine the fuel charge to the consumer. The price that would have been paid to the local supplier can be independently verified, since it is determined by the Platts US Gulf prices, which are openly available.

JPS is also proposing that the fuel rates to consumers should reflect the company’s performance against following target efficiencies:

- Heat rate - 12,976 kJ/kWh (12,300 BTU/kWh), no change from the current targets;
- System losses - 15.8% of net generation, instead of 13.5% at present.

Although system losses of 15.8% instead of 13.5 % reflect reduced efficiency, it is a recognition of the reality of the situation, since the company has operated with loss levels of about 17 % for the last decade or more, and has not achieved 13.5% in more than two decades.

In addition, the existing 13.5% systems loss is presently applied only to the fuel cost while the recommended 15.8% would apply to the total costs.

CHAPTER 2

The OUR's Evaluation of the Application

2.1 Evaluation Procedures

Chapter 4 outlines the principles adopted by the OUR to rate determination, which principles were followed in this instance. The data submitted by JPS was reviewed in detail to assess the company's current financial and operational performance, the validity of the factors on which the need for a rate review was developed and adjusting the factors when they were considered inaccurate or inappropriate. The final step was to determine the structure of the tariffs and the level of rates which would allow the company, if efficiently operated, to earn the revenues which would allow it to provide good quality service and earn a reasonable return on the capital invested.

2.2 Financial Overview

Table 2.1 shows the financial performance of the company over the last two financial years.

Table 2-1

JPS' Financial Performance, 1998 - 2000

	1998/99	1999/2000
	Thousand Dollars	Thousand Dollars
Operating revenues	11,511,555	14,758,653
JPS Fuel cost	2,031,605	3,909,543
IPP Fuel cost	538,264	1,039,352
JPS O&M	3,893,975	4,270,641
IPP Capacity payment	1,883,928	2,413,480
IPP Energy payments	241,631	405,443
AFUDC*	113,779	161,112
Depreciation	1,409,271	1,631,478
Interest	1,164,150	1,069,344
Other charges	14,179	44,297
Taxes	0	0
Extraordinary Item	299,194	
Profit	747,475	136,187
Adjustment for Special Tariff**	1,405,440	1,015,471
Normalised Profit	(657,965)	(879,284)
Normalised profit before Extraordinary item	(957,159)	(879,284)

* AFUDC: Allowance for Funds Used During Construction

** A Special Tariff applicable to all customers' consumption was introduced in February 1999 and remained in effect for six months. This was designed to offset sums refundable due to over-recovery of the fuel clause during the period August 1993 to December 1988.

The profits reported for both years (\$747 million in 1999 and \$136 million in 2000) are distorted because of the impact of the special tariff that was applied to customers' bills between February and July 1999. In order to develop a realistic view of the company's financial performance the reported profits have been adjusted by (a) the inflows from the Special Tariff and (b) the extraordinary item resulting from settlement of insurance claims totalling \$299 million and related to the boiler explosion at the Old Harbour Power Station in 1994. The resultant losses of \$957 million in 1999 and \$879 in 2000 lead the OUR to question the prudence of the company declaring dividends of \$374 million based on its declared earnings at the end of the fiscal year 1998/99. The company's contract with the National Investment Bank of Jamaica (NIBJ) required it to declare dividends on profits, but under the financial conditions prevailing at the time it seems that it would have been appropriate for both JPS and NIBJ to agree to forgo the dividends in this instance. These losses experienced in 1999 and 2000 are however improvements on the \$3,388 million and \$2,038 million suffered in 1997 and 1998 respectively.

2.3 Operational Performance

The company has also shown improvements in its operations since signing the Performance Agreement with NIBJ in 1997, as is shown in Table 2.2.

Table 2-2

JPS' Operational Performance 1997 to 1999

	1997	1998	1999	Performance Agreement Targets	JPS Proposal 2000
System availability %			85.6	90	
Average customer minutes lost	856	449	549	3,000*	
System losses %	17.60	17.07	16.88	13.5	15.8
Heat rate kJ/kWh	13,060	12,694	12,951	12,976	12,976
Customers per employee	204.6	214.6	223.1	200	
Accounts receivable (days outstanding)	54	51	53		

* NIBJ was being unduly pessimistic in establishing service reliability criteria.

Nevertheless, there are still some areas of major relevance to profitability in which urgent need for improvement is needed. These areas include system losses and the level of receivables. In its rate application JPS has established improved targets for these (and other) areas of concern, and its revenue projections are based on the improved performance. The company plans to reduce system losses by at least 1.4%, restructure its

operations to reduce employee costs, keep tight reins on operation and maintenance costs, restructure its loan portfolio to reduce interest costs and increase sales.

2.4 Revenue Requirements

Return on assets. The Office is obliged, under Section 13(2) of The Office of Utilities Regulation Act, to set rates in order to allow a utility to earn the minimum return prescribed by the Minister or in accordance with the terms of an outstanding project loan agreement. Loan 3502-JM between the International Bank for Reconstruction and Development (IBRD) requires JPS to earn such revenues as will yield an annual rate-of-return of not less than 8% on re-valued net fixed assets. This rate-of-return is calculated by dividing net operating profits by the average net value of fixed assets in operation during the year.

The term “net operating profit” means the gross operating revenues from the provision of electric power services, less all operating, administrative and overhead expenses. These expenses include adequate maintenance, straight line depreciation computed in accordance with the Licence and taxes other than taxes on income (if any), but without deduction of interest and other charges on debt.

The company was seeking to earn a net operating profit of \$2,705 million which is the equivalent of a 15.35% rate-of-return on the average projected net plant in service during the year 2000/2001 which is J\$17,625 million. If interest charges of \$1,047 million are deducted, this would yield a net income J\$1,662million.

Return-on-equity. The allowable earnings of a company should cover the cost of capital of the business. This cost of capital is the supply price of funds (equity and debt) needed in the regulated business to finance its operations, i.e. its fixed assets and working capital. Linking the rate-of-return to fixed assets only, although quite common, runs the danger of not providing enough revenue to compensate investors for the risks assumed. This would be especially true of JPS, which is largely financed by debt at an average cost above the 8% rate-of-return on assets required in its loan agreements with the IBRD. Appendix 4 shows various levels of return and the resulting net operating profit levels. At 8% the \$1,395 million of net operating profit will just about cover the interest charges of \$1,047 million.

The standard method for determining a fair return on capital employed (total assets less current liabilities) involves:

- estimation of the capital attraction rate for each component of the company’s capital;
- combination of the various rates into one overall rate in accordance with the percentages each bears to the overall capitalisation.

The cost of capital so derived or established by benchmarking would normally be applied to the net assets of the company. JPS, however, has negative working capital, thus

To avoid this complexity the OUR has opted to calculate the return on the profits derived after charging of interest as a function of the equity of the company. This gives the certainty that all interest charges will be covered and that shareholders will receive a fair return.

The rate-of-return thus provided is not a guaranteed rate-of-return but an opportunity to earn this rate. If JPS does not meet the established efficiency, sales or cost containment targets the projected profits will quickly evaporate due to the high debt/equity ratio.

2.5 Adjusting the Equity Base of the Company

In determining the appropriate equity base for JPS, the OUR made adjustments as far as was reasonably possible for all assets held which were not utilised in the provision of electricity services. (See Appendix 5). These adjustments amounted to \$187 million, which effectively reduced JPS' Equity Base at 1st April 2000 from \$5,649million to \$5,462 million.

The methodologies used in calculating the return on equity shown below all calculate return on the basis of the opening value. The earnings are assumed to flow at the end of the period. These assumptions are important in determining what rate base should be used in calculating the return on equity. To use the end period equity values would assume continuous reinvestment, which would be a false assumption. Any given dollar value of earnings applied to a (higher) mid-point rate base would indicate a lower rate-of-return and would not properly reflect the true annual returns.

Another important consideration in basing calculations on the rate base at the beginning of the period is that this base can be verified. The rate-of-return approved by the regulator on the basis of projections submitted by the utility could be increased if the utility reduced its investment plans or dividend policies differ from those presented with the rate application.

Effect of the Government of JPS's Long-term Debt. The Government has stated that it intends to acquire the long-term debts of JPS and in return will be issued with the equivalent amount of equity. This will in effect result in a capital structure of 100% equity. In accordance with the intent of The All-Island Electric Licence and normal regulatory practice a deemed debt/equity ratio which conforms to customary electric utility operations will be used instead. A ratio of 41% debt to 59% equity will be used in the Revenue Requirements determination.

2.5 Appropriate Return on Equity

In determining the appropriate rate-of-return for JPS, the factors to be considered include:

- Returns of other enterprises having corresponding risks
- Proposed privatisation of JPS
- Country risk
- Vulnerability of the revenue stream to exchange rate movements
- Debt/equity ratio
- The annual revaluation of assets
- The company's monopoly status

2.6 RATE-OF-RETURN ON EQUITY

Choice of the appropriate rate-of-return on equity to be used in calculating JPS' revenue requirements was based to a large degree on a recent study conducted for the cost of capital for the local telecommunications sector. The basic steps used in determining the rate of return on equity were:

- 1) Calculating the return likely to be required by an international investor in the sector;
- 2) Adjustment of the rate-of-return calculated in 1. above for the country risk;
- 3) Determining whether this rate should be adjusted to the local currency by an exchange risk premium;
- 4) Deciding whether a real or nominal rate is to be applied.

Rate-of-return for an International Investor

Using data from 18 companies the appropriate rate-of-return for an international investor was determined by applying the following three methodologies:

- Dividend Discounted Cash Flow (DCF)
- Abnormal earnings DCF

- Capital Asset Pricing Model

The average of the rates resulting from application of these three methodologies was taken to be the appropriate rate.

Dividend Discounted Cash Flow

This approach is based on the realisation that the price of a share of stock, P, should equal the present value of all future dividends.

$$P = \text{Div}_1/(1+k_1) + \text{Div}_2/(1+k_2) + \text{Div}_3/(1+k_3) + \dots$$

Where Div_1 is the expected dividend in year 1, Div_2 is the expected dividend in year 2, etc., and k is the cost of equity.

If a constant growth rate, g, is assumed this model reduces to

$$k = \text{Div}_1/P + g$$

Since a constant growth rate in perpetuity is unrealistic, a more sophisticated version of the model was used. This is the Three-Stage DCF model. The stages are:

- a) The first five years – in which analysts' growth forecast was used
- b) The next 15 years – the growth level tapers to the growth rate of the economy
- c) Year 20 onwards – the growth level equals growth of economy

The average cost-of-equity calculated using this method was 8.81%

Abnormal Earnings Discounted Cash Flow

In this model the current stock price, P, is given as the sum of the current accounting book value and the present value of future expected abnormal earnings. Abnormal earnings, a proxy for economic profits or rents, adjust accounting earnings by deducting a charge for the use of equity capital.

A two-stage model was used - five years of earnings forecast and an assumption that earnings grow at a constant rate equal to the expected long-term inflation beyond five years. This model resulted in an average cost of equity of 9.22%.

Capital Asset Pricing Model (CAPM)

In this model:

Cost of equity = Risk-free rate + (Beta * Market risk premium)

Where:

- the risk-free rate is the rate on Treasury securities;
- Beta measures the systematic risk in investing in a company; and
- the market risk premium is the amount of added expected return that investors require to hold a broad portfolio of common stock instead of risk-free Treasury securities.

The average cost of equity so derived was 11.08%.

Average return for an international investor

The overall average of the three methodologies gave a cost of equity of **9.95%** in nominal U.S. dollars for a global investor

Country Risk premium

The Jamaican sovereign risk premium was estimated using the spread between the yields of U.S. Treasury bonds and U.S. dollar denominated Jamaican Government bonds (Brady bonds). Analysis shows that in 1997 and early 1998 the historical yields of Brady bonds indicated a sovereign risk premium of 3-5%. Following widening of the external current deficit and the Asian financial crisis, in September 1999 a yield of 11.627% was reported for Jamaican Brady bonds while the comparable U.S. Treasury bond was yielding 5.73%, indicating a risk premium of **5.90%**.

At 31st March 2000 a recently issued Brady bond was yielding 9.83% and the comparable maturity yield of U.S. Treasury bond was 6.44% for a premium of 3.39%.

The higher premium of 5.90% derived at September 1999 was used as the Jamaican sovereign risk premium.

The combination of the international investor's cost of equity and the Jamaican sovereign risk gives a **nominal** return in U.S. dollars of **15.85%** for an equity investor in a Jamaican company.

Currency exchange premium

If revenues are earned in local currency, then adjustments have to be made for differences in the rates of inflation in Jamaica and the U.S. These differences will be manifested in devaluation of the local currency. If, however, a company is earning a substantial

amount of its revenues directly or indirectly in U.S. Dollars then there is no need to adjust for the currency exchange premium.

The currency exchange risk premium was estimated as the spread between the Jamaican Treasury bond and the U.S. Treasury bond adjusted for the country risk. The exchange risk premium was calculated to be 9.05%. The nominal return in Jamaican Dollars would, therefore, be 24.90%

JPS has a foreign exchange adjustment clause which effectively makes 75% of its earnings denominated in U.S. dollars. This was designed to cover costs that were foreign exchange sensitive. The balance of the revenue requirements was developed based on the projected local inflation rate and this theoretically is equivalent to foreign inflation plus movement in the exchange rate.

Real vs Nominal Returns

The effects of inflation on returns can be adjusted for in either the rate base or the rate-of-return, but not both if double counting is to be avoided. A company adjusts the rate base for inflation by applying current cost accounting principles or by regularly revaluing its assets on a Modern Equivalent Asset basis. Regardless of which method of adjustment for inflation is applied, comparison with monetary assets is not realistic, since revaluation changes the base amount whilst with monetary assets the base amount is nominally the same. Any change in nominal value of the assets is reflected by a similar change in the amount of equity.

Revaluation of assets in any currency eliminates the inflation and currency risk premium. The real rate-of-return is therefore the same whether it is stated in U.S. or local currency. Assuming a U.S. inflation rate of 2.5%, the 15.85% nominal U.S. dollar return can be restated as **13.35%** real return.

This is the rate-of-return that is appropriate for application to a company that revalues its assets. In practice, the equity investor will benefit from a rate-of-return even greater than the nominal rate indicated when assets are revalued. This windfall arises from the fact that revaluation affects the total assets, not just the portion financed by equity. The total of the revaluation surplus, including that portion related to assets financed by debt, is added to equity. The value of equity is, therefore, increasing faster than the rate of the increase in value of assets.

Adjustments for recent events

The forward-looking market return on equity is very dynamic. As economic conditions change, governments might raise or lower the base risk-free rates or the market might change its perception of risk, thus changing required returns. In terms of the CAPM model the required return on equity, k , in U.S. Dollars for investment in the Jamaican electricity sector is -

$K = \text{U.S. Treasury bond rate} + \text{Jamaican sovereign risk premium} + B^* \text{ market premium}$

The term (B* market premium) was determined on a long-term basis so this need not be adjusted for short-term fluctuations. The sum of U.S. Treasury bond rate and Jamaican sovereign risk premium are equivalent to the yield on Jamaican Government securities. Changes in this rate have to be accommodated as they have a direct impact on investment decisions. The yield on Jamaican Government bonds assumed in calculating the return on equity was 11.627% based on a September 1999 issue. The latest seven-year bond issued on 25th August 2000 was sold to yield a rate of 13.125% or 1.498% above the rate assumed previously. This adjustment would bring the nominal U.S. Dollar return on equity to 17.35% and the real return on equity to **14.85%**.

Applicability of the Analysis to JPS

As previously mentioned, the analysis described above was carried out for the telecommunications sector. A similar study has not been done for the electricity sector but there are sufficient parallels in the two for the results to be used as a proxy until such a study is done.

- a) The two companies to which the results are being applied are dominant service providers in their respective sectors.
- b) The revenues of both companies are substantially protected from the effects of exchange rate variations.
- c) Regular asset revaluations are done with adjustments being made for inflation and exchange rate movements.
- d) The thinness of the Jamaican capital market, the fact that JPS is not listed on the stock exchange, the absence of reliable local forecasts and databases require the analysis be done for a global investor to be then adjusted for the country risk. The risk-free rate and the sovereign risks would be the same for both companies and these form a substantial part of the rate-of-return.
- e) The Betas and market risk premiums would be expected to show some differences. More services in the telecommunications sector are subject to competition than in the electricity sector and therefore the required return in telecommunications would be expected to be higher to compensate for that risk.
- f) On the other hand privatisation in telecommunications is more mature and this may have an effect on the debt/equity ratio. In state-owned companies there is usually a heavier reliance on debt in the capital structure because of the ability to obtain relatively low cost funds. Debt is not only more expensive to private companies, but they also need more matching equity funds in order to obtain the

debt. It is reasonable to expect that in Jamaica the publicly-owned electric utility would have a higher debt/equity ratio than the privately-owned telecommunications counterpart.

- g) The higher the debt/equity ratio the riskier the equity earnings of a company and therefore a higher return would be required.

Taxation

The rate-of-return calculated above is an after-tax rate. The revenue requirement is calculated on a pre-tax basis so the after tax rate of 14.85% have to be grossed up to **22.27%**. The OUR has accepted JPS' arguments that losses carried forward for taxation purposes should not be a factor in assessing the revenue requirements despite the fact that the company may not be liable for taxation in the test year. This is in keeping with the position of the OUR that the cash flow problem due to past losses should not be rectified by the present ratepayers.

The OUR's position is that in the longer term an appropriate rate-of-return should be applied to total capital (i.e. equity and debt). However, it is recognised that at this point in time with a negative working capital it would not be appropriate to apply such a formula. It is expected that, as a matter of priority, JPS will correct the negative working capital position prior to the next rate review, thereby allowing the OUR to apply the proposed working formula.

A pre-tax return of 22.7% on the adjusted equity of \$5,462 million will earn the JPS net profits of \$1,217 million after all relevant expenses, including interest and preference dividends, have been met. It would also conform with the IBRD loan covenants since, if the interest charges are added back, the net operating profits would be \$2,364 million or a return on fixed assets of 13.48%.

The proposed capital restructuring will add an additional \$3,606 million to equity. The required return on equity would now be \$2,020 million.

2.7 DEPRECIATION

In its tariff application JPS included an estimated amount of \$1,605.8 million for depreciation. The OUR has recomputed this figure in accordance with the Electricity Licence Rules and based on the values of aggregate plant in service at March 31, 2000. This results in a depreciation figure of J\$1,685.6 million. The depreciation thus computed assumes that the assets in service at the beginning of the year will be in operation throughout the year. This eliminates the uncertainties arising from the timing and quantum of additions, retirements and revaluation.

2.8 OPERATING AND MAINTENANCE COSTS

Routine Operating and Maintenance Costs. The OUR has reduced the allowable routine operating and maintenance costs from \$4,626 million to \$4,046 million. The reduction by \$580 million on this item results from:

- removing \$647 million from the provision in the application of \$863 million for impending redundancies. The OUR's position is that the benefits of the redundancy exercise will not all be realised in one year but be distributed over future periods, and the costs should be similarly distributed. Four years is considered a reasonable period over which to spread these costs and benefits, a principle which has already been applied in at least one other utility rate evaluation instance in Jamaica. An amount of \$216 million, instead of \$863 million, has been allowed in this tariff application for staff redundancies in the test year. JPS had initially indicated that the total cost of redundancies would be \$500 million;

the new level of redundancies will produce an additional \$201 million of payroll cost savings annually. The OUR expects that there will be additional gains from redundancies but these have been taken into account in this review;

- reducing the projected General Consumption Tax (GCT) charge by \$124.2 million, from \$222.59 million to \$98.412 million. The allowable \$98.412 million represents:
 - the GCT of \$83.683 million paid in 1999/2000, plus;
 - a 15% GCT charge on incremental increase in the non-payroll items that will attract GCT for 2000/2001(See Appendix 6).

Interest Payments. JPS calculates with net interest payment relief amounting to \$1,038 million. This amount was computed by deducting \$445 million for Allowance for Funds Used During Construction (AFUDC) from the gross interest charges of \$1,483 million. However, both the gross interest figure and the AFUDC contained amounts related to a proposed cement plant to be built by the company and a coal expansion plant. Since the cement plant will not be involved in the production and delivery of electricity and the timing of the coal plant is uncertain, net interest has been adjusted to \$1,147 million, thereby reducing the net interest projections.

With the indication of Governments intention to acquire all of the long-term debts of JPS, the company would now have to face the forward-looking cost of the acquisition of new debt.

The amount of debt that the OUR has assumed to be typical for the sector is 41% of the capital structure. An additional \$3,606 million will have to be financed by equity. The interest on the new debt is calculated at the Government of Jamaica Brady bond rate of 13.125%. The gross interest would now amount to \$1,804 million and net Interest \$1,439.

Other Income. An amount of J\$88.5 million representing "Other Income" is shown in the company's operating budget, but was not included in the tariff application. This amount includes interest earned from short-term funds invested by the company and should therefore have been included as "Other Income" in the rate application, since interest charges on loans are allowed as expenses. Revision of projected revenue requirements will affect the cash flow of JPS. The effects of reduced revenue requirements can be reflected either as a reduction in interest income or an increase in interest expense or both. If revised in accordance with the OUR's projections of revenue requirements, the gross interest expenses would move from \$1,483 billion to \$1,512 billion or by \$29 million. The interest income would be reduced from \$88 million to \$75 million or by \$13 million.

The "Other Income" item in the application included \$10 million in rental income assets that were not directly engaged in the provision of electricity services. In conformity with the OUR's principle of not including such assets in calculating the company's equity base, the rental income was deducted from "Other Income". These adjustments serve to increase the total 'Other Operating Revenue' to \$110.5 million.

The proposed restructuring of the company's capital will result in an increased revenue requirement and longer maturity dates of debt. This will result in larger cash balances and therefore increased interest income. The OUR has decided to benchmark the return on cash deposits at the 270 days Treasury Bill rate of 19.67%. The resulting interest income would be \$393 million, a further increase of \$318 million. This brings "Other Operating Revenue" to \$429 million.

IPP and OUR payments. The JPS provisions for capacity and energy payments to the Independent Power Producers (IPPs) and OUR Licence Fees were accepted without modification.

2.9 NON-FUEL REVENUE REQUIREMENTS

The adjustments made to the JPS presentations by the OUR and discussed in the preceding sections of this chapter have the effect of reducing JPS' Non-Fuel Revenue Requirements by \$644 million, from \$11,337 million to \$10,680 million. However, the effect of debt buy-out is to increase profit requirement and interest income thus causing total revenue requirement to be \$11,470 million. Comparison of the JPS and OUR provisions is made in Table 2-3.

The impact of capital restructuring, however, results in a total non-fuel revenue requirement of \$11,344 million.

Table 2-3

Adjusted Non-Fuel Revenue Requirements

	JPS	OUR 1	Difference	With Debt buy-out
	J\$ million	J\$ million	J\$ million	J\$ million
Net Operating Profit	2,705	2,364	(341)	3,459
O & M	4,626	4,046	(580)	4,046
Depreciation	1,606	1,685	79	1,685
Other Income	(45)	(111)	(66)	(429)
CCC revenue*	(457)	(186)	264	(186)
IPP capacity	2,403	2,403		2,403
IPP energy	458	458		458
OUR Fees	34	34		34
Total non-fuel	11,337	10,693	(644)	11,420

*In the OUR projections only the non-fuel revenue from the Caribbean Cement Company is used to reduce the total non-fuel revenue requirements to be recovered from other customers.

2.10 FUEL REVENUES

JPS has projected total fuel expenses of \$5,966 million for the company-owned generating plant for the test year. The JPS calculation was made on the basis of the heat rate for its own units remaining unchanged from the current target of 12,976 kJ/kWh. (The heat rates of the independent power producers are fixed by contract). Given the technical specification of the company-owned generating units no dramatic improvement in heat rate can be expected. However, the company is making significant expenditures in upgrading the units and some return from this investment should be achieved. The OUR expects, however, that with increased availability of base units, improved operating efficiency, and careful scheduling of the units to be placed in service to meet the demand, small reductions in heat rate can be achieved.

In addition, since the OUR has used only the non-fuel revenue of CCC in the calculation of the non-fuel revenue requirement, the total sales of 2,922,538MWh, inclusive of CCC sales, has been used to recover the adjusted fuel budget of \$7,234 million. As a result the OUR's forecast of fuel costs for JPS-owned generating units and recoverable from customers other than CCC, are \$5,658.9 million, \$307.8 lower than JPS'.

2.11 NET REVENUE REQUIREMENTS

JPS calculated the total revenue requirements (from customers other than the Cement Company which is supplied under a special contract) to be \$18,631 million. Adjustments made to the JPS projections by the OUR as discussed in this chapter result in revenue requirements of \$17,667 million, a reduction of \$1,074 million.

The recommended revenue requirements are shown in Appendix 1.

2.12 THE OUR RECOMMENDED AVERAGE TARIFF

The average tariffs recommended by the OUR are calculated on the basis of the revenue requirements shown in Appendix 1 and non-CCC sales of 2,822,537 MWh. The sales figures are higher than the JPS projections of 2,809,083 because of the OUR's higher target for reduction of non-technical losses. These tariffs are shown in Table 2-4 below.

Table 2-4

Average Tariffs Recommended by OUR

	Current US c/kWh	<i>JPS Proposal</i> <i>US c/kWh</i>	Recommended US c/kWh	With debt buy-out
Non-Fuel	8.09	9.17	8.60	9.24
Fuel	5.74	5.90	5.63	5.63
System	13.83	15.07	14.23	14.86

2.13 TARIFF STRUCTURE AND LEVELS

The calculations above indicate what the average tariff should be if JPS were to receive the revenues which the OUR considers necessary to keep it an economically viable enterprise.

Customers are grouped in a number of different categories, each of which is charged on different principles and at different unit rates. Under the Tariff regime, Gazetted on 1st January, 1999, the customer population is divided into five groups, including a special category for street lighting. The categories are:

- Rate 10 Residential
- Rate 20 General customers

Rate 40 Power customers (currently minimum demand of 20kW/month)

Rate 50 Large power customers (minimum demand of 500KVA/month)

Rate 60 Street Lighting

The costs that need to be recovered from each category can be classified into the following groups:

- Customer costs - the overheads incurred in providing supply to each consumer group. These include metering, billing, revenue collection and customer service.
- Energy costs - the non-fuel costs incurred in providing energy to each consumer group.
- Fuel costs – these costs are directly proportional to the non-fuel costs of thermal generation, but are accounted for separately in order to be able to adjust prices to the consumer as the fuel prices change.
- Demand costs - those costs related to the maximum instantaneous power requirements (demand) imposed by various customer groups.

Studies referred to as “cost-of-services studies” calculate for each specific system how the costs ought to be equitably apportioned in billing charges to each customer group. The customer charge reflects the average overhead costs incurred by the utility in providing service to each consumer and varies with the consumer category. Energy consumption is directly measured by the consumer’s meter and is also used to determine the appropriate fuel charge. Maximum demand is also directly measured for consumers in Rates 40 and 50. However, these demand meters are expensive and not considered economic for the measurement of the relatively low demands of consumers in Rates 10 and 20, a generic demand charge is therefore calculated for these Rates and rolled into the energy costs.

JPS had undertaken a cost-of-service study to calculate the appropriate allocation of customer and demand charges to the various tariff classifications. The OUR has reviewed this study and accepted its conclusions.

On the basis of the adjustments made by the OUR to the JPS submission, the rates recommended by the OUR are shown in Table 2-5. For ease of comparison the JPS proposed rates are also included in the table.

Table 2-5

Rates Proposed by JPS and Rates Recommended by OUR

Rate Categories	Current Rate	Proposed by JPS	Recommended by OUR based on Debt Buy-out
	US c/kWh	US c/kWh	US c/kWh
Lifeline	14.05		14.13
RT10	14.82	17.94	16.28
RT20	14.25	14.07	15.32
RT40-LV	13.10	13.48	13.29
RT40-MV	13.10	11.26	13.53
RT50-LV	11.36	12.31	12.02
RT50-MV	11.36	10.44	11.79
RT60	16.21	18.18	17.92
Average	13.83	15.07	14.86

2.14 ADDITIONAL RECOMMENDATIONS

Fuel Clause. The current Fuel Clause in the “Additional Terms and Conditions” of the current Rate Schedules should be modified to:

- Remove the so-called “dead band” whereby movements of fuel prices between 4.57 and 3.6 US cents per kilowatt-hour are not reflected in changes in the fuel charge to customers. Instead, the allowable fuel costs incurred in any one month should be reflected in the billings for that month.
- The allowable energy losses on the transmission and distribution systems be increased from 13.5% to 15.8%. This will better reflect current reality and will be in accordance with the loss levels used to calculate revenue requirements.

2.15 JPS PROPOSALS RECOMMENDED FOR ACCEPTANCE

The OUR further recommends adoption of the following proposals contained in the JPS submission.

- Introduction of a three-period time-of-use tariff for the Rates 40 and 50 categories.
- Measurement of consumer demand for billing purposes in kilovolt amperes (kVA) for both Rates 40 and 50. (The maximum demand of Rate 40 consumers is currently measured in kilowatts (kW)). The power factor correction currently applied to Rate 40 bills is to be discontinued. In order to qualify for rate 40

classification a customer's maximum demand should be not less than 25 kVA (currently it is 20 kW). The corresponding value for acceptance in the Rate 50 category should remain at 500 kVA.

- The time interval between reviews of maximum demand (the so-called "demand ratchet") be reduced from twelve months to six.
- The current Rate 40 and Rate 50 categories be divided into two sub-groups each, based on the voltage level at which supply is delivered.

In addition to the rebalancing of tariffs across rate categories, charges within the various rates were calculated to reflect the relative costs. This has resulted in large increases in customer and demand charges and reductions in energy charges. This charge would have severe consequences for customers in Rate 40 with low power or load factors.

In order to minimize this effect, sub-category of Rate 40 (Rate 40A) has been created. This is applicable to existing customers with demand of 25 kVA or more and whose average monthly consumption during the year 2000 was 30,000 or less.

- Discounts for customer-owned transformers be increased.
- Introduction of a new "Standby" rate for consumers normally supplied from their own generating facilities, but who are dependent on JPS in the event their internal resources cannot satisfy their electricity demands.

2.16 PROPOSALS RECOMMENDED FOR REJECTION

- **Lifeline Rates.** The JPS' proposal is that the subsidised 'lifeline' rate for residential customers be modified to apply only to those whose average consumption is consistently below 100 kWh per month. Customers on this rate would pay the same energy charge as all other residential customers, but would not pay the fuel charge. Currently the energy charge for the first 100 kWh per month is billed at a subsidised rate to all consumers, and all pay the same fuel charge.

JPS' new proposal is that only consumers who have averaged less than the designated consumption for six months would receive the 'lifeline' rate in order to avoid wide variations in the bills of those customers whose consumption fluctuates around the 100 kWh per month margin. They would continue to enjoy this rate until their six-month average exceeded the maximum for the category. Average consumption reviews would be undertaken twice per year at which time such adjustments as are necessary would be implemented. New consumers would begin at the standard residential tariff, and be reassigned to the 'lifeline' category at the next review if they had been on the system for at least three months.

In the OUR's opinion, the new proposal would generate inequities between those consumers whose average consumption is just below 100 kWh per month on the one hand, and just above that level on the other. There is no fundamental reason why 100 kWh per month should be chosen as an indication of the poverty margin, and there will always be some whose consumption is above that average but are more financially disadvantaged than some others with lower average consumption. In addition, with the review strategy proposed, a genuinely poor person may have to wait for more than eight months before being allowed to enjoy the benefits of the lifeline rate.

- **Bill Presentation.** JPS wishes to show a combined energy and fuel charge on the consumers' bills as the basis on which the customers' bills are calculated. (The energy and fuel components would still be shown separately somewhere on the bill). The advantage is supposedly that the bill would be simpler for consumers to understand. The OUR does not share that view. Given the recent volatility in fuel prices, consumers will be less likely to understand the reasons for bill variations if what they see is a single, unpredictable energy charge.

CHAPTER 3

Public Consultation

The OUR published the JPS tariff application in the popular press and invited the public to submit written comments. The response to this was disappointing as only three submissions were received. In a further attempt to engage the wider community in the issue, the OUR arranged a Public Forum to provide an opportunity for interested parties to voice their opinions on JPS' requests for changes in tariffs. The response in this instance was more encouraging as approximately seventy persons attended, representing a wide cross-section of the society. One of the local radio stations did part of its broadcast from the forum. A number of very useful submissions were made, some of which are discussed below. JPS was well represented by senior managers and responded directly to a number of the participants concerns. Some of the issues raised are discussed below.

3.1 System losses

A number of persons were concerned that the high level of system losses meant that the amounts they were having to pay were inflated because of electricity consumed illegally. In its response, JPS acknowledged the severity of the problem, but assured the audience that it was being addressed as a matter of high priority. A Loss Reduction Unit had been formed and charged with the responsibility of reining in system losses. The level of losses had been reduced to 16.5% from more than 17%. The 16.5% comprised 11% technical losses (those resulting from current flowing through wires and transformers) and the remainder was non-technical, including theft.

The OUR agrees with the concerns raised, and its recommendations in this report show that the issue has been addressed. The OUR has, however, accepted JPS' proposal that a 15.8% level of system losses is feasible at the present, it is expected that the bulk of the reduction will occur in the non-technical area and so be reflected immediately in increased revenues. Over the next three years the OUR will review the system losses annually and introduce annual reductions.

3.2 Lifeline Rates

The rates published by the OUR had shown the JPS proposal to reduce the consumption to which the lifeline subsidy was applied from a maximum of 100 kWh per month to 50kWh. It was felt that a small refrigerator should be considered as one of the electricity consuming appliances deserving subsidy, and that the energy consumption of such a refrigerator would push average consumption above 50 kWh.

JPS has subsequently reviewed its position and now proposes that the threshold remains at 100 kWh per month.

3.3 Unification of fuel and energy charges

A number of participants were opposed to JPS' plan to unify the energy and fuel charges for bill calculation purposes and show the individual unit rates in a separate window. The JPS explanation that the proposal would simplify bill presentation did not appear to be well accepted. Apparently recent experience with over-recovery of the fuel charge and difficulties in effecting the rebate have made the fuel component of the bill a very sensitive issue and any reduction in transparency should be avoided.

The OUR concurs with the views expressed and has recommended against acceptance of the JPS proposals on this matter.

3.4 Cross-subsidies

The view was expressed that there should not be any cross-subsidy between rate classes.

Although cross-subsidy was expressed as a concern, JPS has actually made several proposals to eliminate this. The adjustments to rates now being sought may bring the proposed rates closer to the costs of supply for all categories. An important innovation in this regard is that Rate 40 and Rate 50 are being subdivided into low and medium voltage classifications whose different charges will reflect the differences in losses and investment costs that result from supplies at different voltage levels.

The impact of time-of-usage is also being taken into account with the proposed establishment of a three-period time-of-use option for large Commercial and Industrial users. Other cost-reflective proposals include kVA demand billing, reduction of the interval between reviews of maximum demand for billing purposes (the "demand ratchet") and increased discounts for customer-owned transformers.

OUR Comments

Based on the cost of service study done by JPS in 1996, the approved revenue requirement would have caused rate 10 tariffs to increase by an average of 13% with reductions of up to 19% for Rates 40 and 50. The age of the study and inconsistencies in some of the results have caused the OUR to act prudently and not recommend a total rebalancing on this basis. The OUR will conduct a new cost of service study and the results of this will be used to further rebalance the rates over the period 2002 to 2004 when the Price Cap regime will be introduced.

3.5 *The Impact of Independent Power Producers*

Concerns were expressed about the high cost of electricity purchased from IPPs. It was suggested that the company should renegotiate these contracts.

In its response the OUR noted that JPS currently purchases 29% of its net generation from private producers. With such a large percentage of JPS' power requirements being supplied by IPPs the terms of their contracts have a significant effect on the price of power to consumers. The contracts with all of these IPPs are for twenty years, supposedly to allow the investors to recoup their investments. The contracts that have generated the most concerns are those with Jamaica Energy Partners (JEP) and Jamaica Private Power Company (JPPC). These contracts reflect the weak negotiating position in which JPS was in at the time of the negotiations. In the case of JEP, the very high non-fuel variable cost results in the plant being despatched only to 54% of its capabilities on the average. This low capacity factor causes the average cost of electricity purchased to be very high in relation to average tariffs. There may, therefore, be room for negotiating a reduction in variable costs as this could conceivably lead to higher utilisation, greater profits for JEP and lower costs to JPS.

The variable cost of power from JPPC is among the lowest of all thermal units on the JPS system, and as a result it is one of the base-load plants. However, this is offset to some degree by high payments for capacity (the fixed price paid for the kilowatt capacity, whether or not the power is purchased). Since JPPC operates as a base load plant it is not likely to be interested in renegotiating its capacity costs since it would gain no advantage from such negotiations.

3.6 *Quality of service*

The view was expressed that any rate increase should be tied to improved service to the customers.

It was brought to the attention of the participants that the OUR and JPS have agreed on Quality of Service Standards to come into effect at the time of any rate change. Details of these are shown in Appendix 8.

CHAPTER 4

The Rate Making Process

4.1 Introduction

In its approach to determination of the appropriate tariffs for utility services, the Office of Utilities Regulation (OUR) is guided by a number of fundamental principles. These are:

1. The consumers must be provided with services which are of the highest quality economically attainable;
2. The service providers must receive the level of revenues necessary for the efficient provision of the appropriate quality of service. The revenues must cover operating and maintenance costs, debt servicing, contributions towards investments in expanding the services, and a reasonable return on capital invested in providing the services;
3. The prices paid for the services by each consumer should, to the extent feasible, reflect the cost of providing that service to the consumer concerned. Subsidies should be avoided, except for the provision of limited services to the poor who would otherwise find them unattainable;
4. Prices should be so fixed that the service provider will have strong incentives to improve the efficiency of its operations, reduce costs and thereby enjoy a higher return on investments.

The following paragraphs in this section discuss the application of these principles to evaluation of the rate review application submitted by Jamaica Public Service Company (JPS) to the Hon. Minister of Mining and Energy.

4.2 Quality of Service

Independently of the rate review application, the OUR and JPS had agreed on standards by which the quality of service received by customers of the utility could be measured and targets for improvement established. The agreement incorporates two types of standards - (a) guaranteed, and (b) overall. Guaranteed standards set service levels that must be met in provision of service to each individual consumer. Included in this group are such measures of performance as the time taken to provide service after an application is made; response time to emergency service calls; reconnection after payment of overdue amounts, etc. If JPS fails to meet the guaranteed standard, a specified payment will be made to the affected customer. The objective is not so much to compensate the customer for inconvenience or loss, as to provide an incentive to the utility to maintain a high level of service.

Overall standards cover areas of service that affect all or a large group of customers and therefore compensatory payments are not feasible. However, even in such circumstances it is desirable for the company to provide service at a predetermined minimum quality. Examples of overall standards include: service reliability, as measured by the number of minutes per year in which service to the average customer is interrupted; advance notice to customers of planned outages; frequency of meter readings, etc. JPS will not be exposed to direct financial penalties if it fails to meet an overall standard, but its performance in this regard will be taken into consideration during rate reviews. Failure to maintain the established overall standards could therefore result in lower tariffs than would otherwise have obtained.

The quality of service standards, guaranteed as well as overall, will become effective on the same date as the revised tariffs.

4.3 Revenue Levels

High quality electricity service can be achieved only if the utility is provided with the appropriate financial resources. If, with the misguided objective of reducing inflation or improving the competitiveness of certain sectors of economic activity, a utility's revenues are kept below the minimum necessary for efficient service, then the quality and reliability of service will deteriorate and eventually no one will benefit. The Regulator cannot, therefore, reasonably approach a rate evaluation with the objective of not agreeing to any increase in rates, as many in the society have demanded recently. It is, however, the Regulator's responsibility to ensure that increases, if any, are kept to the minimum necessary to provide the revenues needed for efficient service provision. In determining what that minimum increase should be, a number of factors need to be taken into consideration, including efficiency of operation, investment plans and appropriate rates of return on capital invested.

Efficiency of operation is so fundamental to establishing judicious revenue requirements that it will be dealt with in a separate section. The OUR has been concerned for a number of years that JPS was not making timely decisions on expansion planning, especially for generation. These concerns continue, but the related issues have had no significant impact on the projected revenue requirements.

The OUR conducted detailed analyses of appropriate rates of return on capital invested for the provision of electricity services. The analyses involved considerations of cost of capital and risk assessment. It was determined that a rate-of-return on equity of 14.85% after tax was a reasonable figure for the current evaluation.

4.4 Efficiency

The efficiency of a utility's operations cannot be easily quantified and always involves some degree of subjectivity. JPS has achieved demonstrable improvement in some areas of its operations, as is exemplified by the improved reliability of service when compared to the conditions which existed not too long ago. In addition, the OUR consistently receives fewer consumer complaints about JPS' services than it does for the other

national utilities. Nevertheless, there are areas in which the need for efficiency improvement is obvious, and some of these are discussed below. In its approach to efficiency improvement, the OUR does not attempt to “micro-manage” the utility by making decisions that properly lie within the purview of the management. Instead, the areas in which efficiency improvements are needed are identified and the tariff so structured as to provide a financial incentive to the company to effect the improvements. The process by which improvements will be made in order to take advantage of those incentives is decided by the management, not the Regulator. Consideration is given to the reality that in some areas optimum efficiency will be achieved over a period of several years, and therefore the targets established in any given rate review will reflect what is considered to be realistic in the short term, but not the economic optimum. Some of the areas of concern are discussed below.

Losses. The high level of losses¹ being experienced on the JPS system is one of the more obvious areas for efficiency improvement. For the past five years or more the annual losses have averaged about 17% of net generation, a high value by international standards for efficient utilities. These losses increase operating costs and reduce revenues, and their reduction must be a prime objective for improved operating and financial efficiency. The OUR does not trivialise the difficulty of reducing losses on the JPS system. It is an intractable problem and is, in part, an unfortunate reflection on some of Jamaica’s cultural traditions, in which a sizeable minority asserts its rights to consume but does not recognise a corresponding obligation to pay. The OUR also acknowledges that JPS has expended considerable efforts in attempting to reduce losses, to date without significant success. However, despite the difficulty of the task, the current level of losses cannot be tolerated. The consumer should not be expected to bear the cost of the company’s loss reduction efforts if the losses are not in fact being reduced. The OUR has therefore calculated JPS’ revenue requirements on the assumption that losses will be reduced by an increment not less than that which would reduce overall costs by the amount expended on loss eradication efforts. This approach will provide JPS with an added incentive to improve efficiency by reducing losses. If the losses can be reduced by more than the increment calculated by the OUR, the company will benefit from increased revenues and/or reduced operating costs.

The OUR, in avoiding “micro-managing”, will not seek to instruct JPS on how it should more effectively execute its loss reduction program. The incentives will be provided for the managers to make the appropriate decisions. However, attention is being drawn to the fact that giving priority to non-technical losses (caused by power theft, inaccurate meter reading, etc.) will increase the rate of loss reduction and have more immediate impact on revenue enhancement.

¹ “Losses” are defined as the difference between the energy fed into the transmission and distribution systems by the generating stations (“net generation”) and the energy billed to consumers. The losses are normally expressed as a percentage of net generation, and are typically calculated for periods of one year.

Fuel Costs. The cost of fuel consumed in generating electricity can be reduced by a number of actions, two of the more important being (a) reducing the amount of fuel needed to generate a unit of electricity (the kilowatt-hour typically being used as the unit of measurement); and (b) reducing the price paid for each barrel of fuel.

Reducing the amount of fuel needed to generate a unit of electricity. On the average JPS generating units currently consume about 0.7 gallons of fuel to generate one kilowatt-hour (kWh) of electricity. The cost of this fuel is recovered from consumers through application of the Fuel Clause in the Gazetted Rate Schedule. The average age and technical characteristics of the existing generating units are such that no dramatic gains in fuel efficiency can be reasonably expected. Nevertheless, there is always room for improvement, and in its fuel clause determinations the OUR has reduced the amount of fuel allowed for the generation of a kWh of electricity. This will provide JPS with an incentive to generate more electricity from each gallon of fuel, thereby recovering a greater percentage of the company's overall fuel expenses from the fuel charge to consumers. In the OUR's opinion, the fuel efficiency can be improved by fine-tuning the operating conditions of each generating unit and by reviewing the basis on which decisions are made as to which generating units are placed in service to meet incremental increases in system demand. The technical limitations of the generating plant restrict the expected efficiency increases to relatively small margins - two percent after expiry of one year, for an average of one percent over the year would not be unreasonable.

Reducing the price paid for each barrel of fuel. At present JPS purchases all of its fuel from the Petrojam Refinery. The price paid for each barrel (35 Imperial gallons) is indexed to international benchmarks and can therefore be calculated independently of Petrojam's statements. It is very probable that fuel could be purchased at prices lower than Petrojam's, but currently JPS has no financial incentive to investigate these opportunities since any savings would have to be passed on to the consumers through the fuel charge. The OUR has recommended that the Fuel Clause in the Rate Schedule be amended to allow the Petrojam prices to be used in calculating the fuel charge, even if the fuel has been sourced at lower prices. In this way JPS will be financially motivated to seek sources of fuel at prices lower than those of Petrojam. Collusion between JPS and Petrojam to keep the official prices artificially high is not feasible, as the price to be used in the fuel charge will be calculated from the international index, and not from Petrojam releases. In the near future consumers will not directly benefit financially from the new arrangement, but if JPS is successful in finding cheaper sources of fuel it would reduce the pressure for increased revenues from the consumers, and would eventually be reflected in lower rates.

General efficiency considerations. It has already been stated that the OUR will not attempt to usurp the role of management and stipulate in detail the actions that need to be taken to increase overall efficiency. It is also not desirable to attempt to specify the areas in which efficiency gains should be sought. Nevertheless, after reviewing the most recent audited financial statements and the information submitted with the rate review application, it is considered potentially beneficial to the company to record the following comments:

operate in the company's interest, as it had been experiencing cash flow constraints, and the profits realised in that year were due in large measure to the effects of the limited-period special tariff intended to protect the company from financial embarrassment.

- Accounts receivable for the year ended March 2000 were more than 60 percent higher than the previous year.
- The projected expenditures for the ensuing year indicate expenditures of more than 300 million dollars for "Expense Accounts". The notes indicate that this item includes travel and subsistence costs, but does not specify the reasons for the costs being incurred, except to say that none of this amount relates to expenditure for staff training. Such vague classification of major items of expenditure will increase the difficulty of effective monitoring and control.
- The electricity generated by gas turbines in the 1999 to 2000 financial year was three times higher than in the previous year. Power from gas turbines represents the highest incremental generation costs and the increased dependence on this source is an effect of the company's tardiness in making decisions on economic investments in system expansion.
- Transport expenditures for the year ending March 2001 are projected to be about 14 percent higher than the previous year, despite planned reduction in the number of employees and introduction of management systems intended to better control transport expenditures.
- Subscriber television companies continue to be allowed to use JPS poles for their cables without any compensation being received by the utility. Since the investment in the distribution lines are being amortised by electricity rate payers, and since the presence of the cables on the poles increases maintenance costs, the company should move quickly to impose reasonable charges for the use of the infrastructure.

4.5 Cost Reflective Tariffs

The provision of services will achieve the greatest economic efficiency when the prices paid by consumers reflect the costs incurred. It is not feasible to calculate the costs of supply for each individual consumer and fix the relevant tariffs accordingly. Therefore, it is international practice to classify consumers in groups with common characteristics. In the electricity sector the major direct costs of supply are incurred in generation, transmission and distribution. The impact of the various rate categories on the demand is illustrated at Appendix 2. Under the general classification "distribution" supply to the

consumer may be provided at one of two voltage levels, either "primary" (to be standardised at 24 thousand volts, or "secondary", (415 or 220 volts three-phase, or 110/220 volts single phase). The costs of generation, transmission and primary distribution are common to all consumers. However, a consumer who takes his supply at the primary voltage imposes lower investment and operational costs on the system than one who is supplied at the secondary voltage. At the higher primary voltage the utility is spared the investment cost in distribution transformers and secondary lines, and operational and maintenance costs will also be reduced. In addition, the unavoidable technical losses are lower since the current flows through a smaller number of transformers and shorter line lengths on its way from the generators to the consumer. The consumer supplied at the secondary voltages impose additional investment costs for transformers and secondary lines and the utility experiences greater technical losses. In fact, the losses in the secondary distribution system are higher than in any other section of the transmission and distribution systems. The secondary lines and transformers obviously increase the operating and maintenance expenses. The prices paid by consumers at the secondary distribution level should therefore be higher than that paid by consumers being supplied at the primary level. For the first time, the tariffs now being proposed reflect that reality.

The majority, if not all, of the residential consumers take supply from the secondary distribution system. One of the effects of the tariff restructuring will be that residential consumers will see a higher percentage increase and higher average rates than larger consumers supplied at primary voltage. This is at variance with what used to be conventional practice, in which the industrial/commercial consumers would subsidise the residential. There are at least two problems with the old approach. Business consumers operate in an increasingly competitive environment, typically being subject to international competition as well as national. They should not be required to subsidise the utility services provided to others and over which they have no control. In addition, if electricity services to low voltage consumers is subsidised, they will have reduced incentives to conserve electricity and so improve the overall efficiency of the sector. Increasingly, countries around the world are adopting tariffs that are determined by the cost of supply and Jamaica is late in joining the trend.

It is sometimes argued that, in the overall interests of the national economy, electricity services to specific sectors should be subsidised. Agriculture is one of the sectors for which this argument is often advanced. However, if the electricity consumption to a specific sector is needed to keep the sector viable, then that sector should receive direct subsidies from the government. There is no valid reason why the cost of that subsidy should be borne only by the other electricity consumers who gain no commensurate benefits from the improved viability of the sector.

The proposed tariffs show an exception to the principle advocated above that there should be no cross-subsidies in the tariff structure. The exception applies to residential consumers whose monthly electricity usage is less than 100 kWh. Such low average consumption typically reflects a low-income level where the householder would have difficulty in paying for electricity service at its true cost. The exception is made on the

allow usage only for lighting and entertainment. It is unlikely consumers find unreasonable to require the more affluent consumers to share the cost of providing the service to their disadvantaged fellow-citizens, especially as the impact on their own electricity costs will be relatively small.

4.6 Incentives to Efficiency Improvement

The previous paragraphs under the heading "Efficiency" indicated the ways in which tariffs have been so structured as to provide incentives to JPS for efficiency improvements, without the regulator attempting to usurp the role of management. Unless the company takes advantage of these incentives and meets the efficiency targets, it will encounter severe difficulties in achieving its profit objectives.

4.7 Cash Flow

JPS is facing severe cash flow difficulties as a result of past losses and the consequences of certain financial management decisions. The provision to repay \$5.3 billion of loan principal this year is quite unusual as principal payments would normally have been expected to be in line with the cash released by the depreciation charge (\$1.6 billion). Routine capital expenditure is projected to be \$1.4 billion in the test year, putting further pressure on the company's cash position. Programmed borrowings of \$4.3 billion will only cover part of this cash requirement and JPS' expectation was that rate changes would provide the cash needed to cover this shortfall and also eliminate the opening cash deficit of \$386 million.

The difficulties now being experienced by the company are more the result of the approach adopted to financing the business than it is to the cost of producing electricity. Consumers must pay a fair price for the service but should not be asked to directly contribute to capitalising the business. If this were done it would mean that the consumers would pay twice in financing the company, once in directly providing capital and then again for a return on that capital and depreciation.

Giving special treatment to JPS in this regard would send the wrong signals to other utilities operating in Jamaica and to potential investors. Cash problems typically build up over time and should not be expected to disappear in one year. Resolution of the problems will require demonstration of commitment to sustained positive financial performance and convincing creditors that the company is determined to secure improved financial performance through good fiscal management and efficiency improvements.

4.8 Conclusion

The revenue increases recommended are substantially less than that requested by the company, which is currently experiencing cash flow difficulties. However, this cash crunch is the result of investments in long-term assets financed by short-term funds as well as of inadequate profits from operations. In the financial year 1999/2000, cash flow arising from operations was \$214 million. JPS then made investments in fixed assets amounting to \$1,460 million. In addition, \$958 million were received in new loans while \$1,498 million of old debts were paid off. To finance all of this the company increased its short-term debts by \$1,683 million, and is now seeking to convert some of these short-term loans into debts with longer maturity dates.

The Government of Jamaica has now indicated that it will assume all the long-term debts in return for equity in the company. This will serve to ease the cash flow but the cost of equity is higher than that of debt.

The recommended rates will serve to increase JPS' average tariffs by 7.4%. However, they should be enough to provide a reasonable profit on the company's operations. It is therefore the efficiency measures that are being proposed to increase revenues and cut costs that will generate the profits and thus the cash that JPS requires. Failure to meet these targets will result in continued losses and severe financial difficulties.

Tariff determinations are among the more contentious roles that a regulator has to play. Many consumers cannot accept that a service provider must at appropriate times be provided with increases in the rates charged for the service. Regulatory decisions to increase utility rates are often interpreted as a sell-out to the more powerful interests represented by the service provider. The OUR endeavours at all times to demonstrate that, despite its mandate to be an objective arbiter between provider and consumer, it has a special obligation to the consumer as the one at a disadvantage in protecting his or her own interests. The foregoing is intended to demonstrate that the OUR has not approached consideration of the JPS rate review application with any preconceived notions as to whether there ought or not to be a rate increase, but on the basis of clearly established and objective principles. The objective is efficient service, of high, quantifiable standards of quality provided at a reasonable price. Any rate increase is undesirable, but failure to provide the utility with the resources necessary to provide efficient service would be potentially catastrophic.