
Office of Utilities Regulation

Determination on Valuation of Electrical Infrastructure Assets (“the Asset”) to be transferred from Rural Electrification Programme (“REP”) to Jamaica Public Service Company Limited (JPS) (“the Licensee”)



OFFICE OF UTILITIES REGULATION

March 17, 2010

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DOCUMENT TITLE: Determination on Valuation of Electrical Infrastructure Assets (“the Asset”) to be transferred from Rural Electrification Programme (“REP”) to Jamaica Public Service Company Limited (“the Licensee”)

PURPOSE OF DOCUMENT:

In the absence of a resolution regarding the issue of the fair value for the Rural Electrification Programme’s (REP’s) assets and by virtue of the terms and conditions of Condition 26 of the Licence, the Licensee Jamaica Public Service Company Limited (JPS) referred the matter to the Office of Utilities Regulation, (OUR) for its directions regarding the valuation of assets to be transferred from REP.

This document sets out the Office’s Decision with regard to the relevant value as well as its analysis of the methods used by both parties in the valuation of the assets slated for transfer and determines the terms the Licensee shall offer for REP’s assets.

APPROVAL

This document is approved by the Office of Utilities Regulation and the Determinations therein become effective as of **March 18, 2010**.

On behalf of the Office:



Ahmad Zia Mian
Director General

March 17, 2010

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1 Legal Framework

WHEREAS Condition 26 of the All-Island Electric Licence 2001 (“the Licence”) provides:

“1. The Licensee and Rural Electrification Programme Limited (REP) shall periodically agree on the development plans proposed by the REP...” **AND**

WHEREAS REP has financed and constructed 226 kilometers of power lines in rural Jamaica in contemplation of the acquisition of same by the Licensee pursuant to the terms of the Licence **AND**

WHEREAS the Licensee and REP have attempted through a course of meetings and exchange of correspondence to agree on the terms for the purchase of the electrical infrastructure assets (“the Assets”) which have already been handed over to the JPS for its use and operation **AND**

WHEREAS the parties have set out their positions in writing **AND**

WHEREAS there is disagreement between the JPS and REP regarding the approach to be adopted in valuing REP’s asset for the purpose of the transfer and this difference in approach has resulted in a claim by REP for payment of US\$1,571,797, while JPS is offering to pay US\$793,486 **AND**

WHEREAS the parties have been unable to agree on the terms and conditions of the purchase of the assets by the Licensee **AND**

WHEREAS in the absence of such agreement and in accordance with the said Condition 26 paragraph 4 which provides:

“...the Licensee shall refer the matter to the Office who may direct the Licensee as to the terms of its offer to REP” **AND**

WHEREAS the licensee has referred the matter to the Office for such Determination **AND**

WHEREAS the Office has reviewed the positions and arguments proffered by the parties it now sets out in this document:

- its understanding of the positions of both parties;
- its analysis and resulting conclusions on the submissions from the parties;
- its Determination on the matter.

2 REP's Position

REP contends that:

- i. Although the Licence does not provide a formula or directions as to how the value of assets for transfer purposes is to be determined, the terms of offer must satisfy the test of reasonableness.
- ii. The application by JPS of a designated three (3) revenue-year cut-off period to determine the terms of offer is arbitrary and unreasonable, as JPS will continue to earn revenue from the power lines for 30 years.
- iii. The net present value (NPV) approach, which is generally used in relation to investment appraisal, is a universally acceptable methodology used in determining profitability. This should be applied to the assets in question to determine a reasonable terms of offer.
- iv. The application of the Net Present Value Approach to the assets in question should be applied using the parameters set out below and this would result in an NPV of US\$1,571,797.

| <u>Parameters</u> | |
|--|--------------------|
| kWh used per customer per month | 110 |
| Number of customers per km | 19 |
| Revenue (approx.), energy portion per customer per month | \$650 |
| Revenue (approx.), energy portion/year 1 | \$148,200 |
| Revenue growth rate/year: | 2% |
| Cost of Capital (after tax): | 8% |
| Investment – JPS offer 3 years revenue | \$453,551 |
| Useful Life of Investment | 30 years |
| | |
| <u>Results</u> Net Present Value: | \$1,571,797 |

3 JPS' Position

JPS proposed that the take-over value of the assets to be acquired from REP should be determined by the *relative productivity of the REP lines compared to all JPS distribution lines and that this should be expressed in terms of the average kWh sales per kilometer of line, or Sales Productivity Index (Spi).*

To compute the so-called Asset Take-over Value (Vt), JPS defines the following as relevant parameters:

- **Per km Sales Productivity Index (Spi)** – The relative earning of the REP distribution asset per km compared to the average earning per kilometer for the total distribution system.
- **Line Asset Value Index – (Lvi):** The relative value of the REP distribution line asset compared to the average JPS distribution subdivision based on the per kilometer Sales Productivity.
- **Asset Take-over Value – (Vt):** Cost to be paid by JPS per km of REP line acquired based on the JPS average construction cost per km and the Line Asset value Index of the REP line to be acquired.
- **Reference Construction Cost (C_{JPS}):** JPS’ average construction cost per kilometer of distribution line constructed within the period of construction of the REP lines to be acquired by JPS under the Licence.

Asset Take-over Value (Vt), is then determined by the equation:

$$Vt = C_{JPS} * Lvi_{REP} / Lvi_{JPS}$$

Where

$$Lvi_{REP} = Spi_{REP} / Spi_{JPS}$$

$$Lvi_{JPS} = Spi_{subdiv} / Spi_{JPS}$$

$$Spi(n) = kWh / kilometer(n) / kWh_{JPS_{System}}$$

Applying the per kilometer Sales Productivity Index approach results in a 17.55% Asset Value Index for REP lines compared to JPS lines. Thus based on JPS’ average cost of US\$20K/km, the subject REP lines should be acquired at US\$3,511K/km.

The breakdown for JPS' REP Asset Value Computation is shown below.

Asset Transfer Price Based on JPS' Sales Productivity Approach

| Item | Description | JPS System | JPS Sub-divisions(R10) | REP Sub-divisions |
|----------|---|------------|------------------------|-------------------|
| 1 | Customer/km of line | 63 | 100 | 30 |
| 2 | kWh/customer per month | 458 | 188 | 110 |
| 3 | kWh/km per month(1*2) | 28,854 | 18,800 | 3,300 |
| 4 | per km sales productivity index (spi) | 1.00 | 0.65 | 0.11 |
| 5 | Construction Cost - US\$/km (C) | | \$20,000 | \$19,397 |
| 6 | Line asset value index (Lvi) | | 100% | 17.55% |
| 7 | Asset take-over Value - US\$/km (Vt) | | | \$ 3,511 |

Applying the above approach, JPS calculated the fair value to be paid REP for the 226 km of distribution lines constructed by REP between 2001 and 2004 at US\$793,486.

JPS *submitted* that the Sales Productivity Index approach satisfies the provisions of the Licence, particularly Condition 26, paragraph 6 (c, d).

4 OUR's Position on REP's NPV Approach and JPS' Sales Productivity Index (SPI) Method

The Office has considered both approaches and its respective position on both are as follows:

REP's Present Value (PV) Approach

The PV approach proposed by REP is flawed as it equates the value of the assets to the PV of all income flows over the 30 years useful life of the assets. The cost/revenue assumptions used by REP incorrectly assumes that capital investment on the distribution line construction is the only cost incurred by JPS in the provision of each unit of service and thus all revenues are attributable to this cost. This approach omits:

- the operating and maintenance (O&M) cost associated with the supply of electricity on the distribution lines to the customers;
- the capital cost of generation and transmission and customer service;
- the cost of funds associated with investment in other areas.

In addition, the eight (8) percent discount rate used is inconsistent with the Weighted Average Cost of Capital (WACC) allowed by the Regulator of 12.0 percent.

Correcting the above errors would result in a much lower transfer price than the US\$1,571,797 computed by REP.

5 JPS' Sales Productivity Index (SPI) Method

With regard to JPS' Sales Productivity Index (SPI) Method, the Office's comments are as follows:

The assumptions/premises put forward by JPS in its justification for the use of the SPI method reflect a snapshot in time and do not take fully into consideration the historical and future prospect for customer and revenue growth. It assumes, for example, that the relative proportion of sales per kilometer on REP lines to JPS subdivision lines will remain constant. However, as has been the case historically, the proportion changes over time.

Due to the low per kilometer sales of REP lines at the time of the calculations, applying the Sales Productivity Index Method would not secure a fair value for REP. The Office therefore considers the approach proposed by JPS, unsuitable.

6 OUR Approach

There are shortcomings in both of the proposed approaches, however, the Present Value (PV) which is generally used in relation to valuations, is a universally acceptable methodology used in determining the value of assets. The Office has determined that the fair value for the transfer of the line assets to JPS will be the Present Value (PV) of the revenue flows that can be attributed to the distribution assets.

In order to account for the cost/revenue cash flows that should result from the capital investment on the distribution line construction the analysis has to take into account the following:

- the operating and maintenance (O&M) cost associated with the supply of electricity on the distribution lines to the customers;
- the capital cost of generation and transmission and customer service;
- the cost of funds associated with investment in other areas.

Breakdown of the non-fuel costs associated with the supply of energy to residential customers¹

¹ The breakdown was derived from the cost of service study and tariff revenue requirement , 2004

| | (US¢/kWh) |
|------------------|-----------|
| Generation | 5.39 |
| Transmission | 0.98 |
| Distribution | 2.28 |
| Customer Service | 0.45 |

Based on the cost of service study and the tariff revenue requirement, approximately 2.28 c/kWh or 24.65% of non-fuel revenue would be attributable to the distribution asset investment.

In the supply of energy to REP customers, JPS would be able to recover through its non-fuel tariffs:

- (i) cost on the Distribution System averaging 2.28 ¢/kWh. as estimated from JPS cost of Service study;
- (ii) cost on its Generation and Transmission system; and
- (iii) costs for customer service.

It is also likely that as the economic condition of the country improves, customer density on the REP distribution lines will increase, as was the case at Negril West End in Westmoreland. Some distribution lines will experience higher growth in density than others, but taken together, it is reasonable to assume that customer growth on these distribution lines will increase on an annual basis. This can be measured against the background of an annual average compound growth rate of 4.0% for JPS customer base over the period 1996 – 2006. The OUR accepts JPS' estimation of 30 customers per kilometer of distribution line.

It is also reasonable to expect that as economic conditions improve in the country the average use per customer will also increase. This will result in increase revenue per customer to JPS. Based on analysis of historical data supplied by JPS it can be deduced that the annual revenue growth from REP customers average 2.5% over the period 1996 – 2006.

1. The parameters to be employed to determine the fair value of the asset are as follows:

- KWh used per customer per month: 110
- Number of customer per km: 30
- Revenue (approx.) energy portion per REP customer per month: \$650
- Revenue (approx.) energy portion/year: 1,234,000 (\$650 x 30 x 12)

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- Revenue growth rate/year: 2.5%
- Cost of Capital (after tax): 12%
- Useful Life of Investment: 30 years

Results

2. Employing the above parameters result in a Present Value of US\$4,854 per kilometer **and total take-over value of \$1,097,095 at 2004 prices.**

7 Determinations

The Office **HEREBY DETERMINES** as follows:

1. There is agreement between the parties that:
 - i. The REP has constructed 171 distribution lines between 2001-2004 representing 226 kilometers of power-line at a cost of J\$245,634,574.00 at an average cost of J\$1,086,878.00 per kilometer (US\$19,397).
 - ii. The industry benchmark of the average cost per kilometer for the construction of power-lines is J\$1,120,600.00 (US\$20,000).
 - iii. The basis for the computation of the price to be paid to the REP shall be based on the actual revenue history derivable from the said lines.
 - iv. No issue arises in relation to Condition 26 clause (3) of the Licence which would require the OUR to consider or make any pronouncement.
 - v. The average useful life of the said lines is 30 years.
2. The points of disagreement are:
 - i. REP claims the application of a designated three (3) year revenue cut-off period to determine the terms of offer is arbitrary and unreasonable, as the Licence will continue to earn revenue from the power lines for 30 years.
 - ii. REP's insistence on the PV approach to determine reasonable terms of offer and JPS' insistence on the Sales Productivity Index Method.

The PV approach, which is generally used in relation to investment valuation and is a universally acceptable methodology for determining the value of assets, shall be applied

to determine reasonable terms of offer for the REP distribution asset. The Office believes that the justification of the use of PV approach applied to the non-fuel revenue stream associated with distribution is sound and valid and satisfies the provisions of the licence, Condition 26, paragraph 6 (c, d).

Results

3. Employing the PV method and the above parameters, results in a Present Value of US\$4,854 per kilometer and total take-over value of US\$1,097,095 at 2004 prices.

Additionally, REP is entitled to be compensated for a rate-of-return on the take-over value at the opportunity cost of capital at 12% per annum for the period beginning January 2005.

Appendix 1 sets out the formula which is applied for determining the purchase price to be paid by JPS for REP Distribution line assets contracted between 2001 and 2004.

APPENDIX 1

**DETERMINATION OF PURCHASE PRICE TO BE PAID BY JPS FOR REP
DISTRIBUTION LINE ASSETS CONSTRUCTED BETWEEN 2001 AND 2004**

Asset Transfer Price Based on Net Present Value Approach

| | | |
|--------------------------|---|--------------------|
| <u>Parameters</u> | Exchange Rate (J/US\$) in 2004 | 56.03 |
| | OUR Summary Functionalisation and classification of non-fuel O&M costs | |
| | <u>JPS Net Operating Cash flow from **</u> | US¢/kWh |
| | Generation | 5.39 |
| | Transmission | 0.98 |
| | Distribution | 2.28 |
| | Customer Service | 0.45 |
| | Total | 9.10 |
| | Input Assumptions | |
| | 1 km distribution line | |
| | kWh used per customer per month: | 110 |
| | Number of customer per km: | 30 |
| | Revenue (approx), energy portion per customer per month | \$650 |
| | Revenue (approx), energy portion/year 1 (\$) | 234,000 |
| | Revenue growth rate/year | 2.5% |
| | Cost of Capital (after tax) | 12.00% |
| | Useful Life of Investment | 30 |
| | Capital and O& M Cost per 1 km distribution Line | |
| | Generation (US\$) | 2,134 |
| | Transmission (US\$) | 388 |
| | Distribution (US\$) | 903 |
| | Customer Service (US\$) | 180 |
| | Total Capital and Non-Fuel O&M (US\$) | 3,605 |
| | Asset take-over Value - US\$/km 2004 Constant Dollar | \$4,854 |
| | ** based on tariff data derived from functionalisation and classification of non-fuel costs | |
| | United States cumulative Inflation factor | 1.0000 |
| | Asset take-over Value - US\$/km 2008 Dollar | \$4,854 |
| | Asset take-over Value for 226 km of lines - US\$ | \$1,097,095 |

| Year | Expected Revenue flow US\$ | Discounted Revenue US\$ | Expected Revenue out-flow O&M US\$ | Discounted Values US\$ | Expected Net Revenue flow | Discounted Net Revenue flow |
|------|----------------------------|-------------------------|------------------------------------|------------------------|---------------------------|-----------------------------|
| 1 | 4,176 | 3,729 | 3,605 | 3,219 | 571.23 | 510 |
| 2 | 4,281 | 3,413 | 3,659 | 2,917 | 621.56 | 496 |
| 3 | 4,388 | 3,123 | 3,732 | 2,657 | 655.40 | 466 |
| 4 | 4,497 | 2,858 | 3,844 | 2,443 | 653.12 | 415 |
| 5 | 4,610 | 2,616 | 3,960 | 2,247 | 650.23 | 369 |
| 6 | 4,725 | 2,394 | 4,078 | 2,066 | 646.68 | 328 |
| 7 | 4,843 | 2,191 | 4,201 | 1,900 | 642.46 | 291 |
| 8 | 4,964 | 2,005 | 4,327 | 1,748 | 637.51 | 257 |
| 9 | 5,088 | 1,835 | 4,457 | 1,607 | 631.82 | 228 |
| 10 | 5,216 | 1,679 | 4,590 | 1,478 | 625.33 | 201 |
| 11 | 5,346 | 1,537 | 4,728 | 1,359 | 618.01 | 178 |
| 12 | 5,480 | 1,407 | 4,870 | 1,250 | 609.82 | 157 |
| 13 | 5,617 | 1,287 | 5,016 | 1,150 | 600.72 | 138 |
| 14 | 5,757 | 1,178 | 5,166 | 1,057 | 590.66 | 121 |
| 15 | 5,901 | 1,078 | 5,321 | 972 | 579.59 | 106 |
| 16 | 6,049 | 987 | 5,481 | 894 | 567.47 | 93 |
| 17 | 6,200 | 903 | 5,646 | 822 | 554.25 | 81 |
| 18 | 6,355 | 826 | 5,815 | 756 | 539.88 | 70 |
| 19 | 6,514 | 756 | 5,989 | 695 | 524.31 | 61 |
| 20 | 6,676 | 692 | 6,169 | 640 | 507.47 | 53 |
| 21 | 6,843 | 633 | 6,354 | 588 | 489.31 | 45 |
| 22 | 7,014 | 580 | 6,545 | 541 | 469.77 | 39 |
| 23 | 7,190 | 531 | 6,741 | 497 | 448.79 | 33 |
| 24 | 7,370 | 486 | 6,943 | 457 | 426.31 | 28 |
| 25 | 7,554 | 444 | 7,152 | 421 | 402.25 | 24 |
| 26 | 7,743 | 407 | 7,366 | 387 | 376.54 | 20 |
| 27 | 7,936 | 372 | 7,587 | 356 | 349.13 | 16 |
| | | | | | flow | flow |

| Year | Expected Revenue flow US\$ | Discounted Revenue US\$ | Expected Revenue out-flow O&M US\$ | Discounted Values US\$ | Expected Net Revenue | Discounted Net Revenue |
|------|--|----------------------------|--|---------------------------|----------------------------|------------------------------|
| 28 | 8,135 | 341 | 7,815 | 327 | 319.92 | 13 |
| 29 | 8,338 | 312 | 8,049 | 301 | 288.84 | 11 |
| 30 | 8,546 | 285 | 8,291 | 277 | 255.82 | 9 |
| | Net Present Value of Expected cash Flow | \$40,884 | | \$36,029 | | \$4,854 |

JPS/REP TRANSFER PRICING

| REP Lines Summary Data | |
|---|---------|
| All Projects (n = 171) km | 226 |
| Total Cost - All Lines -J\$million | 245.6 |
| Customers Connected | 3,179 |
| Cumulative Non-Fuel Revenue - J\$million | 32.4 |
| Non-Fuel Revenue/Project Cost - Percent | 13.2% |
| Weighted Average Elapsed Years | 2.1 |
| Average - All Projects | |
| Average Cost per km - US\$ | 19,395 |
| Average No. of Customers per line (km) | 19 |
| Average Revenue Per Customer - J\$million | 10,192 |
| 3 - year Projects (n=21) | |
| Total Cost - J\$ million | 59.9 |
| Customers Connected | 360 |
| Cumulative Non-Fuel Revenue - J\$ million | 5.7 |
| Non-Fuel Revenue/Project Cost - Percent | 9.5% |
| 2-year Project (n = 138) | |
| Total Cost - J\$ million | 136.8 |
| Customers Connected | 2253 |
| Cumulative Non-Fuel Revenue - J\$ million | 21.9 |
| Non-Fuel Revenue/Project Cost - Percent | 16.0% |
| Best 3-yr Project Best Overall | |
| Project Name: Oracabessa/Bariff Hall/Cross Roads | |
| Line Cost - J\$ | 353,119 |
| Customers Connected | 15 |
| Cumulative Non-Fuel Revenue - J\$ | 312,783 |
| Average Revenue Per Customer - J\$ | 20,852 |
| Non-Fuel Revenue/Project Cost - Percent | 88.6% |
| Best 2 -year project | |
| Project Name: Air Base/Hertford/Middle street | |
| Line Cost - J\$ | 784,256 |
| Customers Connected | 44 |
| Cumulative Non-Fuel Revenue - J\$ | 541,223 |
| Average Revenue Per Customer - J\$ | 12,301 |
| Non-Fuel Revenue/Project Cost - Percent | 69.0% |