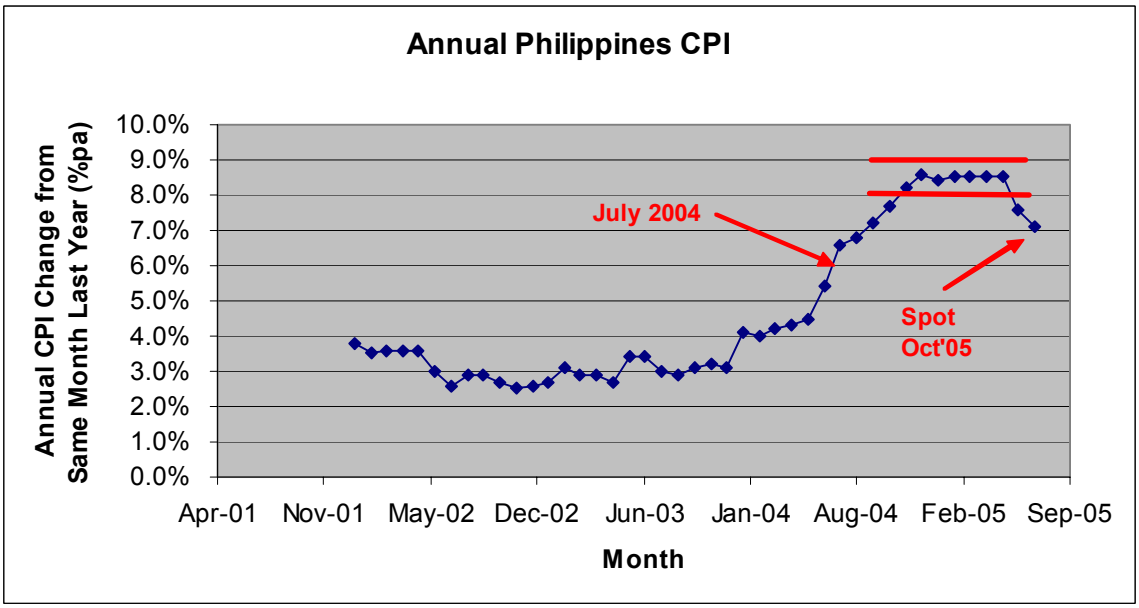
Figure 6.3 : USA Inflation Rate

6.8 CPI in the Philippines

6.8.1 The Philippines CPI is shown in Figure 6.4. The Philippines inflation after initially increasing rapidly in the last two quarters of 2004 has now begun to moderate the first half of 2005. Overall the Philippines inflation increased over the period since the release of the Issues paper in July 2004. The spot rate average over a five business day period is 7.10% pa as shown in Table 6.1. The long term average is 4.71% pa.



Source : NSO, Philippines

Figure 6.4 : Philippines Inflation Rate (% pa)

6.8.2 The ERC analysis suggests the WACC outcomes are very sensitive to the inflation rate assumptions used when an indirect measure of the risk free rate is estimated, and for the general adjustment between real and nominal representations of the WACC.

6.8.3 If the latest data is taken (averaged over the last five trading days), or the average over the available information (January 2002 to July 2005 for Philippines CPI, and January 2002 to September 2005 for USA CPI), the average inflation looks as in Table 3. Interestingly the difference in the inflation measured as either a spot rate or as a long-term average are quite similar. This difference has a prime impact on the indirect estimate of the risk free rate.

CPI Measure	Average Spot (5 Days)	Long –term Average
Philippines CPI	7.10%	4.71%
USA CPI	4.69%	2.40%
Delta (Philippines less USA)	2.41%	2.31%

Table 6.1 : Inflation Differences between the Philippines and the USA (% pa)

6.9 Philippines Country Risk Premium

6.9.1 The country risk premium can be estimated from direct and indirect measures of market data. The ERC has used two different data sources to verify the estimate of the country risk premium (CRP) for the Draft Determination. These are discussed in the following paragraphs.

6.9.2 The data available at the time of the Issues Paper suggested the CRP was approximately 2.5% pa. This estimate was based on the differences in yields offered to retail investors from newspaper advertising13.

6.9.3 During the public hearing on WACC issues, Professor Anthony van Zijl indicated the ERC estimate of CRP was too low, and preferred the description of Sovereign Risk Premium (SRP). In his paper of the TRANSCO WACC he provided his estimates of the SRP were 4.72% in July 2004 and 4.78% in August 2005. These were based on data sourced from the Bloomberg market data service.

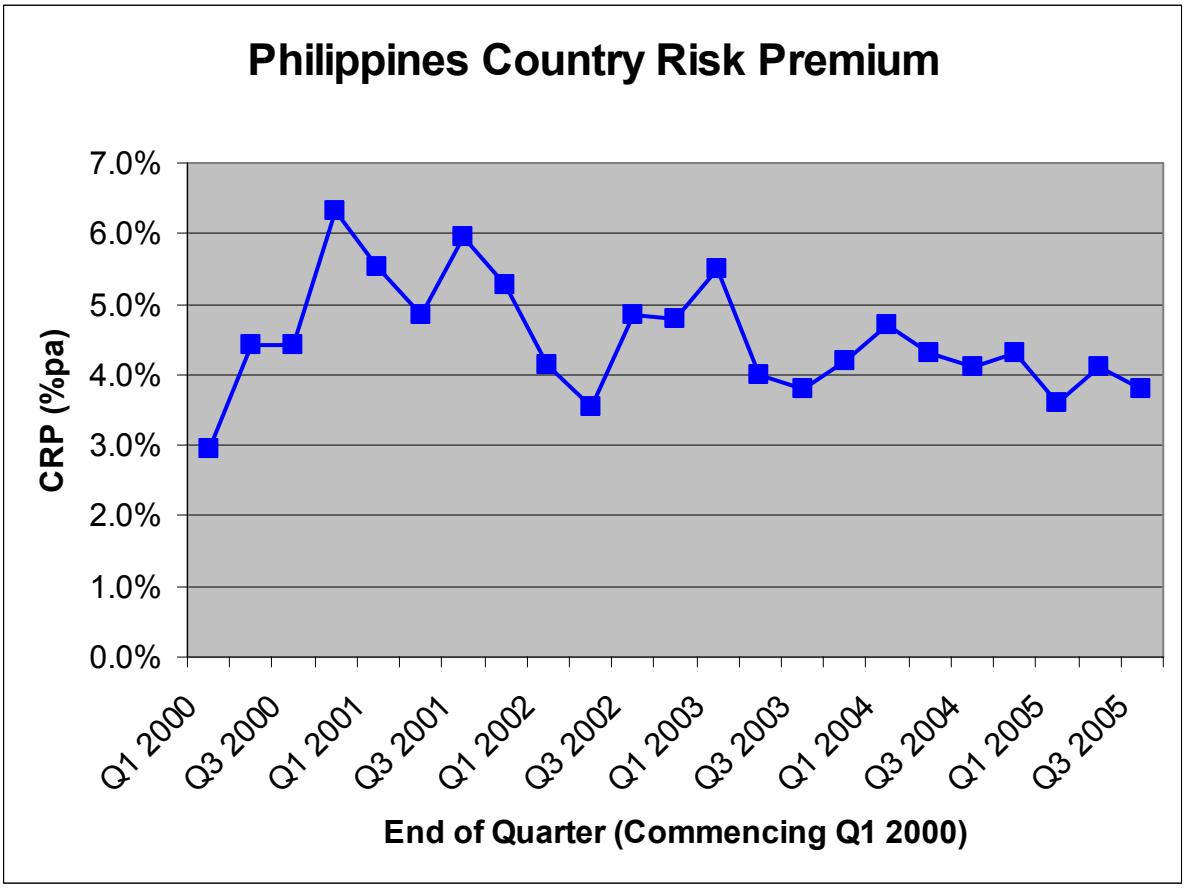
6.9.4 The ERC has separately gone to this data source to look for supporting information. The data from Bloomberg has an average yield of 8.20% for Philippine US$ Treasury Bonds maturing between 19 and 24 years from 2005, and an average yield of 4.8% for USA US$ Treasury Bonds with similar maturing dates.

6.9.5 The CRP is thus suggested to equal 3.4% pa (8.20% minus 4.8%). This is towards the lower bound discussed on November 23, 2005 at the public hearing. Professor Anthony van Zijl clearly stated his preference to use data from the upper bound of particular market data to partly compensate for risks not otherwise compensated, such as regulatory risk.

6.9.6 The ERC also sought data on the CRP measured by an independent source to the current regulatory debate. The data shown in Figure 6.5 was sourced from independent data sourced from the UK office of PricewaterhouseCoopers, who use US$ bond yields and country rating statistics to derive measure of CRP on a quarterly basis. The data suggests the CRP for the Philippines is currently between 3.5% and 4.5% using data from the period, Q2 2004 to Q3 2005.

6.9.7 The ERC notes that the CRP as measured through an independent data provider suggests the volatility of the Philippines CRP is diminishing over time, and appears to be trending down slowly.

[13] Refer to paragraph 6.8 in the Issues Paper.



Source : PwC, UK Cost of Capital Centre of Excellence.

Figure 6.5 : Philippines CRP (% pa)

6.9.8 Both data sources support the ERC's current preference to use a CRP estimated from the lower to mid range of the available data, at 4.0% pa.

6.10 Review Direct and In-Direct Measure of Philippines Risk Free Rate

6.10.1 An in-direct estimate of the risk free rate in the Philippines is thus possible from the following formula:

$$rf = (1+r_{USA}) / (1+CPI_{USA}) \times (1+CPI_{Phil}) \times (1+CRP) - 1$$

Where:

r_{USA} = 4.36% to 4.86% with mid range at 4.61%

CPI_{USA} = 4.19% to 5.18% with a mid range at 4.69% ;

C_{Phil} = 6.6% to 7.6% with mid range at 7.1% ; and

CRP = 3.75% to 4.25% with mid range at 4.0%.

Thus the estimate of the risk free rate in the Philippines using offshore measures is between 10.79%pa and 11.83%pa with a mid range at 11.31% pa.

6.10.2 A direct measure of the Philippines risk free rate was also sought, even though the ERC had previously expressed concern over the liquidity of the long-dated Philippine government Treasury Bonds. The yield drawn directly from the BSP web site which shows a yield of 11.73% pa on a Philippines 10 year Treasury Bond as at August 2005. The estimates from two sources are quite similar, and the ERC prefers to use the lowest number for the WACC estimate.

6.10.3 Thus for the Draft Determination the ERC prefer to use 11.31% pa as the mid range value for the risk free rate in the Philippines.

6.11 Measurement of Benchmark Equity Betas

6.11.1 The TWRG specifies a de-levering formula in Section 4.9.8 as follows (the terms are defined in the TWRG):

$$Beta_a = Beta_e \ / \ [1 + (1 - T_e) \ x \ D_m / E_m]$$ [14]

6.11.2 This formula is used to take an observed market "equity beta" for a particular stock and to de-lever it to an "asset beta". There are a number of assumptions used in this analysis, but the primary assumption is that the observed variability of a stock price in the market place is a result of 'systematic' risk arising from 'operational' risk (usually thought of as the fixed to variable cost structure of the particular type of business) and 'financial' risk (or leverage risk associated with the proportion of debt used to fund the company). The 'asset' beta is assumed to embody the 'operational' risk seen by the market for assets of a similar type relative to the average risk of the market portfolio (the so-called market line). Where the asset has a systematic risk which is equal to the average of the market portfolio, the asset beta is equal to 1.0. If it is perceived to be less risky than the market portfolio, the asset beta will be less than 1.0, if more risky it will greater than 1.0.

6.11.3 The de-levering formula gets rid of the impact of the financial leverage (including the tax effect). It should be noted there is a preference to use the 'effective' tax rate for the observed stocks, but in many instances the data on these stocks does not include the effective tax rate, and this is difficult to research given language differences which exist. As a result the corporate tax rate or the highest marginal corporate tax rate is used as a proxy for the effective tax rate.

6.11.4 Table 6.2 below shows the de-levering data used for the estimate of the asset betas for the Draft Determination using the formula above (two columns closest to right hand side).

[14] This formula is the Hamada levering / unlevering formula.

Company	Country	Corporate Tax Rate	Market Capitalisation	Net Debt	Gearing (D/D+E)	Equity Beta Bloomberg	Asset Beta Full Set (with tax)	Asset Beta Selected (with tax)	Asset Beta Full Set (without tax)	Asset Beta Selected (without tax)
Electricity Transmission										
TRANSENER SA-B	ARGENTINA	35.0%	630.35	1,688.83	0.73	0.91	0.33	0.33	0.25	0.25
CIA DE TRANSMISSAO DE ENE-PF	BRAZIL	15.0%	3,890.20	58.64	0.01	0.96	0.95	0.95	0.95	0.95
BORALEX INC -CL 'A'	CANADA	21.0%	224.90	65.29	0.22	0.49	0.40	0.40	0.38	0.38
INTERCONEXION ELECTRICA SA	COLOMBIA	36.7%	3,649,299.60	1,708,414.00	0.32	1.16	0.89	0.89	0.79	0.79
RED ELECTRICA DE ESPANA	SPAIN	35.0%	2,970.54	1,951.49	0.40	0.80	0.56	0.56	0.48	0.48
Total Electricity Transmission Mean					**0.34**	**0.86**	**0.63**	**0.63**	**0.57**	**0.57**
Total Electricity Transmission Median					**0.32**	**0.91**	**0.56**	**0.56**	**0.48**	**0.48**
Gas Transmission										
AUSTRALIAN PIPELINE TRUST	AUSTRALIA	30.0%	1,020.76	988.93	0.49	0.44	0.26		0.22	
GASNET AUSTRALIA GROUP	AUSTRALIA	30.0%	384.38	609.26	0.61	0.64	0.30		0.25	
SNAM RETE GAS	ITALY	33.0%	8,961.19	2,859.00	0.24	0.54	0.44		0.41	
SUI SOUTHERN GAS CO LTD	PAKISTAN	35.0%	14,262.45	5,864.17	0.29	0.93	0.73		0.66	
Total Electricity Transmission Mean					**0.41**	**0.64**	**0.44**		**0.38**	
Total Electricity Transmission Median					**0.39**	**0.59**	**0.37**		**0.33**	
Total Transmission Mean - gas and electricity					**0.37**	**0.76**	**0.54**		**0.49**	
Total Transmission Median - gas and electricity					**0.32**	**0.80**	**0.44**		**0.41**	
Electricity Vertically Integrated										
AUSTRALIAN ENERGY LIMITED	AUSTRALIA	30.0%	56.10	-3.26	(0.06)	0.56	0.56		0.56	
CENTRAIS ELETRICAS BRAS-PR B	BRAZIL	15.0%	22,920.00	25,212.12	0.52	1.25	0.65		0.60	
CIA ENERGETICA DE PER-PREF A	BRAZIL	15.0%	842.67	901.90	0.52	0.41	0.21		0.20	
ELETROPAULO METROPOLITA-PREF	BRAZIL	15.0%	4,044.03	3,181.59	0.44	1.16	0.70	0.70	0.65	0.65
LIGHT SERVICOS DE ELETRICID	BRAZIL	15.0%	2,093.82	4,060.03	0.66	1.10	0.42	0.42	0.38	0.38
INTERNATIONAL POWER PLC	BRITAIN	30.0%	3,491.65	2,786.00	0.44	1.06	0.68		0.59	
SCOTTISH & SOUTHERN ENERGY	BRITAIN	30.0%	8,442.00	1,687.70	0.17	0.63	0.55		0.52	
CIA GENERAL DE ELECTRICIDAD	CHILE	16.5%	982,728.04	851,272.73	0.46	0.72	0.42		0.39	
EMPRESA ELECTRICA ANTOFAGAST	CHILE	116.5%	42,127.57	-440.70	(0.01)	0.34	0.34	0.34	0.34	0.34
ENERSIS SA	CHILE	16.5%	3,823,452.01	3,201,735.00	0.46	1.29	0.76		0.70	
CLP HOLDINGS LTD	HONG KONG	17.5%	107,287.36	16,254.00	0.13	0.44	0.39		0.38	
AEM TORINO SPA	ITALY	33.0%	891.98	739.00	0.45	0.76	0.49		0.42	
CHUBU ELECTRIC POWER CO INC	JAPAN	30.0%	2,030,287.05	3,072,473.00	0.60	0.50	0.24		0.20	
HOKURIKU ELECTRIC POWER CO	JAPAN	30.0%	505,682.60	929,833.00	0.65	0.48	0.21		0.17	
TENAGA NASIONAL BHD	MALAYSIA	28.0%	31,797.83	28,739.20	0.47	1.06	0.64	0.64	0.55	0.55
CONTACT ENERGY LTD	NEW ZEALAND	33.0%	3,949.94	1,075.47	0.21	1.03	0.87		0.81	
KARACHI ELECTRIC SUPPLY	PAKISTAN	35.0%	52,361.74	21,127.43	0.29	0.78	0.62	0.62	0.56	0.56
IRKUTSKENERGO	RUSSIA	24.0%	48,440.30	-169.22	(0.00)	0.87	0.87		0.87	
KOREA ELECTRIC POWER CORP	SOUTH KOREA	27.0%	21,409,834.00	18,139,243.00	0.46	0.67	0.41		0.36	
ALLETE INC	UNITED STATES	35.0%	1,308.29	197.90	0.13	0.97	0.88		0.84	
AVISTA CORP	UNITED STATES	35.0%	816.27	1,082.34	0.57	1.00	0.54		0.43	
BLACK HILLS CORP	UNITED STATES	35.0%	1,344.91	709.24	0.35	1.01	0.75		0.66	
DPL INC	UNITED STATES	35.0%	3,246.02	1,928.70	0.37	0.92	0.66		0.58	
DUKE ENERGY CORP	UNITED STATES	35.0%	25,513.62	18,299.00	0.42	0.81	0.55		0.47	
FIRSTENERGY CORP	UNITED STATES	35.0%	15,360.46	11,071.84	0.42	0.71	0.48		0.41	
FPL GROUP INC	UNITED STATES	35.0%	15,735.60	9,519.00	0.38	0.72	0.52		0.45	
TXU CORP	UNITED STATES	35.0%	22,212.79	12,745.00	0.36	0.81	0.59		0.52	
Total Vertically Integrated Mean					**0.37**	**0.82**	**0.56**	**0.54**	**0.50**	**0.49**
Total Vertically Integrated Median					**0.42**	**0.81**	**0.55**	**0.62**	**0.52**	**0.55**
Total Selected Mean								**0.58**		**0.53**
Total Selected Median								**0.59**		**0.52**

Hamada →

Harris - Pringle ↓

Notes

Market Cap & Gearing based on Bloomberg data as at 3,4 November 2005

Table 6.2. : Equity Beta from Overseas – De-levering

6.11.5 The TWRG specifies a re-levering formula in Section 4.9.7 as follows (the terms are defined in the TWRG):

$$Beta_e = Beta_a \times [1 + (D / E)]$$ [15]

6.11.6 This formula is used to take an agreed "asset beta" for a particular stock (usually the average of the de-levered asset betas of other stock with the same type of fundamental assets and physical situation either within the same market or where these do not exist, in overseas markets) and to re-lever it to an "equity beta" for the particular business under consideration. The re-levering adds back the assumed effect of the financial leverage (or financial risk) which the particular business will be assumed to adopt. In the case of the TWRG, the assumed financing is 50% debt and 50% equity, so the ratio D/E is equal to 1.0, and the value of the square brackets is equal to 2.0.

6.11.7 The assumptions underlying the Capital Asset Pricing Model (CAPM) are being employed for this analysis.

6.11.8 The discussion of the de-levering and re-levering formulae was required because of a potential revision in the approach to the re-levering formula specified by the TWRG, which the ERC believes it should consider, even if this cannot occur before the Third Regulatory Period. The proposal is to revert to using the Hamada re-levering formula to match the use of the Hamada de-levering formula application. The following formula is proposed:

$$Beta_e = Beta_a \times [1 + (1 - T_e) \times D_m / E_m]$$

6.11.9 The reason for this ERC proposed change, is that the information provided by the public hearing on the WACC strongly suggests that a mixed use of de-levering and re-levering formula requires mixed assumptions for the CAPM and WACC formula applications, and this will distort (either amplify or shrink the resulting asset beta in an unintended manner. Indeed, the ERC suggests the higher WACC outcomes indicated for the "Adjusted ERC WACC" in Tables 3 and 416 of Professor van Zijl's WACC paper, are primarily due to this mixed use of levering formula in the "Beta Unlevered" and "Beta Relevered" terms, particularly because the Beta Relevered value uses the Harris – Pringle formula.

6.11.10 The ERC explored the 'consistency' in the levering formula by using the Hamada and the Harris – Pringle formula consistently on otherwise the same input data and ERC WACC methodology. Tables 6.3 and 6.4 below indicate the results. The results suggest that if the Hamada levering formulae are used consistently, a lower WACC results than if the Harris – Pringle formulae are used consistently.

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[15] This formula is the Harris – Pringle formula which is normally used in conjunction with the 'classical' WACC formula, which is expressed as the post-tax nominal WACC. See Ogier T., Rugman J., and Spicer L., *The Real Cost of Capital* – A business field guide to better financial decisions, Prentice-Hall, 2004, Chapter 1 and page 208.

[16] Professor van Zijl, *A Review of the Approach and Parameters used by the ERC in the Determination of the Weighted Average Cost of Capital* , 26 August 2005, pages 19 and 20.

6.11.11 Other WACC research material was accessed to determine whether the 'vanilla' WACC formula specified in the TWRG (see Section 4.9.3) required other particular parameter or formula settings which might impact on the decision of which levering formula to use. It was found that the vanilla WACC formula was *"appropriate as the discount rate for "* … *"after-tax net cash flows"* and these cash flows were in general defined by Professor Officer in his publications as :

Cash Flow = Xo – T x (Xo-Xd) [17]

6.11.12 Professor Officer indicates that in *"using this definition of WACC the tax advantages of an imputation tax are reflected in the determination of after-tax net cash flows"*. A review of the building blocks in Section 4.5.7 and the tax component in Section 4.12 of the TWRG indicates that the cash flows to be placed in the building block analysis are indeed of this form, albeit without any imputation effect offset. An offset either of the type suggested by Professor Officer (and the Australian imputation tax system) or of the type suggested for the Philippines by Professor van Zijl (through use of different tax rates on interest or dividends).

Hamada Levering Formula

Low Range Estimate		
Equity Ratio (Equity/Assets)		50%
Debt Ratio (Debt/Assets)		50%
Risk Free Rate		10.79%
Country Risk Premium		3.75%
Risk Free Rate USA		4.36%
Forecast Inflation USA		4.19%
Debt Margin		1.00%
Market Risk Premium		6.00%
Equity Beta		0.974
Asset Beta		0.584
Forecast Inflation Philippines		6.60%
Corporate Tax Rate Philippines		33.39%
Post Tax Cost of Equity (Nominal)		16.63%
Post Tax Cost of Equity (Real)		9.41%
Pre Tax Cost of Debt (Nominal)		11.79%
Pre Tax Cost of Debt (Real)		4.86%
	Pre Tax	Post Tax
WACC (Real)	11.05%	5.29%
WACC (Nominal)	18.37%	12.24%
WACC (Vanilla)		14.21%

High Range Estimate		
Equity Ratio (Equity/Assets)		50%
Debt Ratio (Debt/Assets)		50%
Risk Free Rate		11.83%
Country Risk Premium		4.25%
Risk Free Rate USA		4.86%
Forecast Inflation USA		5.19%
Debt Margin		1.50%
Market Risk Premium		6.00%
Equity Beta		0.974
Asset Beta		0.584
Forecast Inflation Philippines		7.60%
Corporate Tax Rate Philippines		33.39%
Post Tax Cost of Equity (Nominal)		17.67%
Post Tax Cost of Equity (Real)		9.36%
Pre Tax Cost of Debt (Nominal)		13.33%
Pre Tax Cost of Debt (Real)		5.32%
	Pre Tax	Post Tax
WACC (Real)	11.46%	5.27%
WACC (Nominal)	19.93%	13.27%
WACC (Vanilla)		15.50%

Table 6.3. : High & Low WACC Estimates using Hamada Levering Formula

[17] Professor R.R. Officer, *The Cost of Capital of a Company Under an Imputation Tax System* , Accounting and Finance, May 1994, page 7, equation 12 and taking gamma = 0 where the imputation effect is of zero benefit to shareholders.

Harris - Pringle Levering Formula

Low Range Estimate

Equity Ratio (Equity/Assets)	50%
Debt Ratio (Debt/Assets)	50%
Risk Free Rate	10.79%
Country Risk Premium	3.75%
Risk Free Rate USA	4.36%
Forecast Inflation USA	4.19%
Debt Margin	1.00%
Market Risk Premium	6.00%
Equity Beta	1.064
Asset Beta	0.532
Forecast Inflation Philippines	6.60%
Corporate Tax Rate Philippines	33.39%
Post Tax Cost of Equity (Nominal)	17.17%
Post Tax Cost of Equity (Real)	9.92%
Pre Tax Cost of Debt (Nominal)	11.79%
Pre Tax Cost of Debt (Real)	4.86%

	Pre Tax	Post Tax
WACC (Real)	11.43%	5.54%
WACC (Nominal)	18.78%	12.51%

WACC (Vanilla)	14.48%

High Range Estimate

Equity Ratio (Equity/Assets)	50%
Debt Ratio (Debt/Assets)	50%
Risk Free Rate	11.83%
Country Risk Premium	4.25%
Risk Free Rate USA	4.86%
Forecast Inflation USA	5.19%
Debt Margin	1.50%
Market Risk Premium	6.00%
Equity Beta	1.064
Asset Beta	0.532
Forecast Inflation Philippines	7.60%
Corporate Tax Rate Philippines	33.39%
Post Tax Cost of Equity (Nominal)	18.21%
Post Tax Cost of Equity (Real)	9.86%
Pre Tax Cost of Debt (Nominal)	13.33%
Pre Tax Cost of Debt (Real)	5.32%

	Pre Tax	Post Tax
WACC (Real)	11.84%	5.53%
WACC (Nominal)	20.34%	13.55%

WACC (Vanilla)	15.77%

Table 6.4. : High & Low WACC Estimates using Harris - Pringle Levering Formula

6.11.13 Other WACC research suggests the use of "after tax net cash flows" required by the 'vanilla' WACC is consistent with the use of the Hamada formula for levering of beta. Ogier et. al.18 suggest that "the Hamada levering / unlevering formula and the Modigliani – Miller WACC formula must be used in conjunction with one another, although a long-form way of calculating the MM WACC is also to use the Hamada levering / unlevering formula in conjunction with the standard WACC formula". In the latter instance the use of the Hamada formula with the standard WACC formula works provided "the level of debt remains constant, and the tax shields are know with certainty" and in the latter instance, tax impacts are usually estimated in the cash flows to ensure the latter assumption holds true. It should be noted that the "standard" WACC formula as Ogier et. al. refer to it is the same as the "vanilla" WACC used by the Australian regulator of the electricity transmission networks.

6.11.14 The above discussion suggests there are four options available to the ERC on the issue of which levering formula to use for the Draft Determination. These are:

(a) Leave the mixed levering formula provided in the TWRG in place (this approach has been adopted by Professor van Zijl and it escalates WACC estimate) and flag to the industry that this methodology change will be active from the beginning of the Third Regulatory Period;

[18] See Ogier T., Rugman J., and Spicer L., *The Real Cost of Capital* – A business field guide to better financial decisions, Prentice-Hall, 2004, page 217 & 218.

(b) Adopt the Hamada levering formula in a consistent manner for the Second Regulatory Period (is consistent with the remaining TWRG formula and provides a lower WACC estimate, albeit above the Issues Paper estimate) which necessitates a change to Section 4.9.7 of the TWRG with the agreement of TRANSCO; or

(c) Adopt the Harris – Pringle levering formula in a consistent manner for the Second Regulatory Period (is not consistent with the remaining TWRG formula and provides a mid-range WACC estimate) which also necessitates a change to Section 4.9.8 of the TWRG with the agreement of TRANSCO.

6.11.15 The ERC believes it should continue to use the TWRG methodology as defined. The ERC further suggests it adopt the Hamada formula for de-levering and re-levering for the Third Regulatory Period, and discuss the impact of this adjustment to the TWRG through this public hearing process. The main reason is that at the current level of research undertaken it is the most consistent approach to all of the other formula for WACC development currently embedded in the TWRG, while at the same time in order to retain the "certain" nature of the regulatory arrangements, the TWRG should not change in significant terms for the Second Regulatory Period.

6.11.16 The adoption of this ERC revised re-levering methodology, leads to the large change in asset beta observed between the Issues Paper and the Draft Determination. In normal circumstances the asset betas do not change very quickly over time. The tables above exhibit a large change because of the move to a consistent application of the de-levering and re-levering formula.

6.11.17 During the public hearing on the WACC, the TRANSCO / PSALM Independent Expert suggested there was a reversal of use of the formula in the TWRG in the de-levering step of the example estimate presented in the Issues Paper. Further investigation showed that while the correct formula within the TWRG were used, a quirk in the Excel cell format rules meant that the tax rate was divided by 100 within the de-levering formula. The outcome with rounding in significant figures looked like the de-levering formula without a tax adjustment had been applied. The third and fourth columns from the right hand side of Table 6.2 show the outcome as if the de-levering was done with the correct tax adjustment. To summarize, in the Issues Paper an asset beta which was too low was used at around 0.47 (now measured as 0.53 in Table 6.2), whereas the ERC's current analysis shows a value of 0.58 should be used where a Hamada levering formula is adopted. Refer to the "Selected" columns in the Table 6.2, at the average number presented at the lowest point on the table.

6.11.18 The correction in the application of the TWRG formula and the update of market asset beta information increases the regulatory WACC estimate by 5% for the low range case and 3% for the high range case.

6.12 Asset Beta – Comparable Overseas Companies

6.12.1 Selection of companies from overseas was used to provide an indication of the TRANSCO asset beta. The companies selected for this comparison were all of the known listed electricity transmission businesses, and five electricity businesses which have both transmission and distribution networks, but are otherwise not vertically integrated into electricity generation or supply activities. The increase in the number of comparison

companies followed feedback from the public hearing on WACC issues which suggested the Issues Paper used too few comparable companies.

6.12.2 Appendix B provides descriptions of the electricity and gas companies listed in Table 6.2.

6.12.3 The effect of the additional data has been to shift the proposed asset beta from 0.47 in the Issues Paper to 0.58 using the Issues Paper formula in Section 4.6.8 of the TWRG, or to 0.53 using a non-tax adjustment de-levering formula (the same as in Section 4.6.7 of the TWRG).

6.12.4 Information from overseas jurisdictions suggests asset betas allowed by regulators for electricity transmission companies lie somewhere between 0.35 to 0.63. Table 6.5 shows the latest available data from overseas jurisdictions, and is reproduced from the Issues Paper for comparison purposes.

Price Determination/Regulated Entity	Regulator	Asset Beta	Equity Beta
Victoria Transmission Network Revenue Caps 2003 – 2008 - Powernet	ACCC	0.4	1.0
Snowy Mountains Hydro-Electric Authority Transmission Network Revenue Cap 1999/00 – 2003/04	ACCC	0.3-0.5 (0.4 mid-point)	0.75-1.25 (1.0 mid-point)
Draft Decision NSW and ACT Transmission Network Revenue Caps - TranGrid - 2004/05 - 2008/09	ACCC	0.4	1.0
Final Decision on National Grid Company	Ofgem	0.3 – 0.4 (draft)	1.0

Source:

- Snowy Mountains Hydro-Electric Authority Transmission Network Revenue Cap 1999/00-2003/04, 7 February 2001, ACCC

- Decision Victorian Transmission Network Revenue Caps 2003-2008, 11 December 2002, ACCC

- Draft Decision NSW and ACT Transmission Network Revenue Caps - TransGrid 2004/05-2008/09, 28 April 2004, ACCC

- The transmission price control review of the National Grid Company from 2001 Transmission asset owner Final proposals – Ofgem, September 2000, to expire 2006.

Table 6.5 : Overseas Regulatory Decisions on Asset Betas

6.13 Updated Draft WACC for Draft Determination

6.13.1 Table 6.6 shows the updated draft WACC for the Draft Determination.

6.13.2 The output provides a regulatory 'vanilla' WACC range of 14.8% to 16.1% pa nominal, and a mid-point regulatory 'vanilla' WACC of 15.4% pa nominal for the revenue path modeling for the Draft Determination.

WACC Calculation Worksheet

Input only in shaded cells - TRANSCO Independent Adviser Approach on the Left

		Regulatory WACC Estimate by ERC		
Paramaters		***Low***	***Mid***	***High***
Gearing (Debt) ratio	D/(D+E)	50%	50%	50%
Equity ratio	E/(D+E)	50%	50%	50%
Debt to Equity	D/E	1.00	1.00	1.00
Asset beta (degeared empirical beta)	$ß_a$	0.579	0.584	0.589
Risk free rate (nominal - US$ 20 or 10 Year Bond Yields in USA)		4.36%	4.61%	4.86%
Application of Forex Inflation Adjustment				
Country Risk Margin (excluding FX Risk)	CRP	3.75%	4.00%	4.25%
Risk free rate used in WACC	R_f	10.79%	11.31%	11.83%
Risk free rate (nominal - US$ 20 Year Bond Yields in Philippines)				
Application of Forex Inflation Adjustment				
Debt Margin	DM	1.00%	1.25%	1.50%
Cost of debt (pre-tax nominal peso terms)	**K_d**	**11.79%**	**12.56%**	**13.33%**
Market Risk Premium (Developed Country)	$R_m - R_f$	6.00%	6.00%	6.00%
Sovereign Risk Premium (excluding FX Risk)	SRP			
Damodron (Relative Volatility)				
Emerging Market Risk Premium (Philippines)	EMRP			
Market Return Inferred	r_m			
Corporate tax rate	t_c	33.4%	33.4%	33.4%
Interest tax rate				
Dividend Tax Rate				
Effective tax rate levering	T			
Inflation rate (Philippines)	i	6.60%	7.10%	7.60%
Inflation Rate (USA)		4.19%	4.69%	5.19%
Calculated Equity (Regeared) Betas	***Formula***	***Low***	***Mid***	***High***
Equity Beta (1) Simple No Tax Adjustment	1	1.16	1.17	1.18
Equity Beta (2) Simple Tax Adjustment	2	0.97	0.97	0.98
Other Parameters				
Equity beta (geared beta)	$ß_e$	1.16	1.17	1.18
Cost of Equity (post-tax nominal)	**K_e**	**17.74%**	**18.32%**	**18.90%**
WACC Matrix - Commercial Practice				
Post-tax nominal		**12.79%**	**13.34%**	**13.89%**
Post-tax real		5.81%	5.83%	5.85%
Pre-tax nominal		19.21%	20.03%	20.85%
Pre-tax real		**11.83%**	**12.07%**	**12.32%**
Vanilla WACC (nominal)	wt	**14.76%**	**15.44%**	**16.12%**

Source : ERC Analysis.

Table 6.6 : : TRANSCO's WACC Updated for Draft Determination

6.14 Comparison of ERC's and Independent Expert's View

6.14.1 The ERC has reviewed the WACC methodology proposed by Professor Anthony van Zijl, TRANSCO / PSALM's Independent Expert on WACC. He has proposed an approach which recognizes the differences in tax rates imposed in the Philippines on corporate income tax (35% for 2006 through 2008, then 30% from 2009), on interest income in the hands of the shareholder (20%) and on dividend income in the hands of the shareholder (10%). The methodology by necessity is different to that used in New Zealand, Australia and the USA to recognize that, amongst other things, these countries have 'imputation tax' systems on dividend payments and the Philippines does not. There are no specific imputation tax arrangements in the Philippines tax system, so that the income stream is taxed first in the hands of the company is also taxed in the hands of the shareholders on the basis of the interest or dividend income they receive. At the same time the differences in tax rates have an implied partial imputation effect, so the methodologies used in other jurisdictions have some contribution to make to the Philippines WACC debate.

6.14.2 In effect, the formulae used by Professor van Zijl estimate the increase required for the market cost of capital to accommodate the higher combined overall tax paid by the company, and by the shareholders, albeit at different tax rates. After these taxes are paid, the shareholders are still seeking a return commensurate with the risks of their investment. One concern the ERC has is that the approach described by Professor van Zijl is not particularly well described and it is unclear whether the approach has been subject to academic peer review through the normal academic publication process and rebuttal. As it also uses a different approach and different formulae than New Zealand or Australia, there is some risk in adopting the approach as documented, even it the Additional Risk Premium (ARP) is omitted.

6.14.3 The calculation of WACC using Professor van Zijl's methodology is reproduced in Table 6.7 below. ERC notes that the values for both July 2004 and August 2005 he has provided in his paper, are not exactly reproduced in Table 6.4. Additional dialogue on the methodology and feedback from the public hearing process would be required to isolate any interpretational differences in ERC's reproduction of this WACC approach.

6.14.4 It should be noted that the methodology adopted in the ERC's Issues Paper assumes the interest and dividends are both taxed in the hands of the shareholder at the same rate as the corporate income tax rate. The proposed revision of the use of the asset beta levering formula by the ERC for the Third Regulatory Period should ensure that this approach more consistently applies the double taxation outcomes in the Philippines.

Transco Regulated WACC Estimate - Base on Peso Debt Financing

WACC Calculation Worksheet

Input only in shaded cells - TRANSCO Independent Adviser Approach on the Left

		Independent Adviser		Regulatory WACC Estimate by ERC		
Paramaters		***Jul-04***	***Aug-05***	***Low***	***Mid***	***High***
Gearing (Debt) ratio	D/(D+E)	65%	65%	50%	50%	50%
Equity ratio	E/(D+E)	35%	35%	50%	50%	50%
Debt to Equity	D/E	1.86	1.86	1.00	1.00	1.00
Asset beta (degeared empirical beta)	$ß_a$	0.65	0.65	0.579	0.584	0.589
Risk free rate (nominal - US$ 20 or 10 Year Bond Yields in USA)		5.42%	4.60%	4.36%	4.61%	4.86%
Application of Forex Inflation Adjustment		7.48%	8.58%			
Country Risk Margin (excluding FX Risk)	CRP	0.00%	0.00%	3.75%	4.00%	4.25%
Risk free rate used in WACC	R_f	7.48%	8.58%	10.79%	11.31%	11.83%
Risk free rate (nominal - US$ 20 Year Bond Yields in Philippines)		10.14%	9.38%			
Application of Forex Inflation Adjustment		12.29%	13.54%			
Debt Margin	DM	1.70%	1.70%	1.00%	1.25%	1.50%
Cost of debt (pre-tax nominal peso terms)	**K_d**	**13.99%**	**15.24%**	**11.79%**	**12.56%**	**13.33%**
Market Risk Premium (Developed Country)	$R_m - R_f$	6.00%	6.00%	6.00%	6.00%	6.00%
Sovereign Risk Premium (excluding FX Risk)	SRP	4.72%	4.78%			
Damodron (Relative Volatility)		1.50	1.50			
Emerging Market Risk Premium (Philippines)	EMRP	13.08%	13.17%			
Market Return Inferred	r_m	19.7%	20.8%			
Corporate tax rate	t_c	35.0%	35.0%	33.4%	33.4%	33.4%
Interest tax rate		20.0%	20.0%			
Dividend Tax Rate		10.0%	10.0%			
Effective tax rate levering	T	88.9%	88.9%			
Inflation rate (Philippines)	i	4.40%	6.50%	6.60%	7.10%	7.60%
Inflation Rate (USA)		2.40%	2.60%	4.19%	4.69%	5.19%
Calculated Equity (Regeared) Betas	***Formula***	***Jul-04***	***Aug-05***	***Low***	***Mid***	***High***
Equity Beta (1) Simple No Tax Adjustment	1	1.86	1.86	1.16	1.17	1.18
Equity Beta (2) Simple Tax Adjustment	2	1.43	1.43	0.97	0.97	0.98
Other Parameters						
Equity beta (geared beta)	$ß_e$	1.43	1.43	1.16	1.17	1.18
Cost of Equity (post-tax nominal)	**K_e**	**25.41%**	**26.52%**	**17.74%**	**18.32%**	**18.90%**
WACC Matrix - Commercial Practice						
Post-tax nominal		**14.81%**	**15.72%**	**12.79%**	**13.34%**	**13.89%**
Post-tax real		9.97%	8.66%	5.81%	5.83%	5.85%
Pre-tax nominal		22.78%	24.18%	19.21%	20.03%	20.85%
Pre-tax real		**17.60%**	**16.60%**	**11.83%**	**12.07%**	**12.32%**
Vanilla WACC (nominal)	wt	**17.99%**	**19.19%**	**14.76%**	**15.44%**	**16.12%**
plus ARP	2.0%	19.99%	21.19%			
WACC (nominal)	wn	**22.78%**	**24.18%**			
plus ARP	2.0%	24.78%	26.18%			

Source : ERC Analysis.

Table 6.7. : Regulatory WACC Estimate, Van Zijl and ERC TWRG Methodology

6.14.5 This means that where the ERC revised methodology is applied and where everything else is assumed equal, the ERC revised methodology should produce a slightly higher WACC estimate than Professor van Zijl's methodology (assuming the ERC's understanding of the van Zijl's methodology is accurate).

6.14.6 As the ERC does not agree with Professor van Zijl's approach of using input values towards the higher end of the reasonable market range for each particular WACC parameter, a different outcomes results. The outcome in Table 6.7 shows that with the ERC assumptions on input values, the mid-point vanilla WACC estimate using the TWRG methodology is 15.4% at end October 2005 which compares to Professor van Zijl's estimate of 20.0% from his paper (or recalculated at 19.2% in Table 6.4) at August 2005. This comparison occurs before the ARP proposed by Professor van Zijl is added. His ultimate value of 27.2% from his paper (or recalculated at 26.2% in Table 6.4) is 5.8% higher than the ERC estimate using the TRWG methodology. This appears excessive.

6.15 Discussion of Differences

6.15.1 There are a number of issues raised by Professor van Zijl's WACC methodology which the ERC believes have yet to be properly justified in the context of the primary principles agreed by Professor van Zijl in the public hearing process to date. The agreed principles are as follows:

- That "double compensation" for a particular risk is not economically efficient;
- That if a particular risk is compensated in the forward cash flows that it should not also be compensated through inclusion in or escalation of the WACC; and
- That a margin over WACC is not justified, when the risks identified can be readily included in the cash flows against which a pure systematic WACC is applied.

6.15.2 In all instances, the ERC suggests there is the potential to harm the public interest where an excessively high WACC, not supported by market measures of particular risk components, is applied in a regulatory reset used to set the revenue cap for a PBR.

6.15.3 The following sections look briefly at some of the ERC concerns.

6.16 Mixed versus Consistent Levering Formula

6.16.1 On a number of occasions, TRANSCO / PSALM representatives have suggested that the debt or gearing ratio suggested in the Issues Paper is not compatible with the way the business will be funded post appointment of a concessionaire. The ERC believes this outcome has been the result of the detailed outcomes using the TWRG levering methodology. Figure 6.6 shows the outcomes of the TWRG WACC using the end October 2005 data. Clearly the 'vanilla' WACC value rises as the gearing is increased.

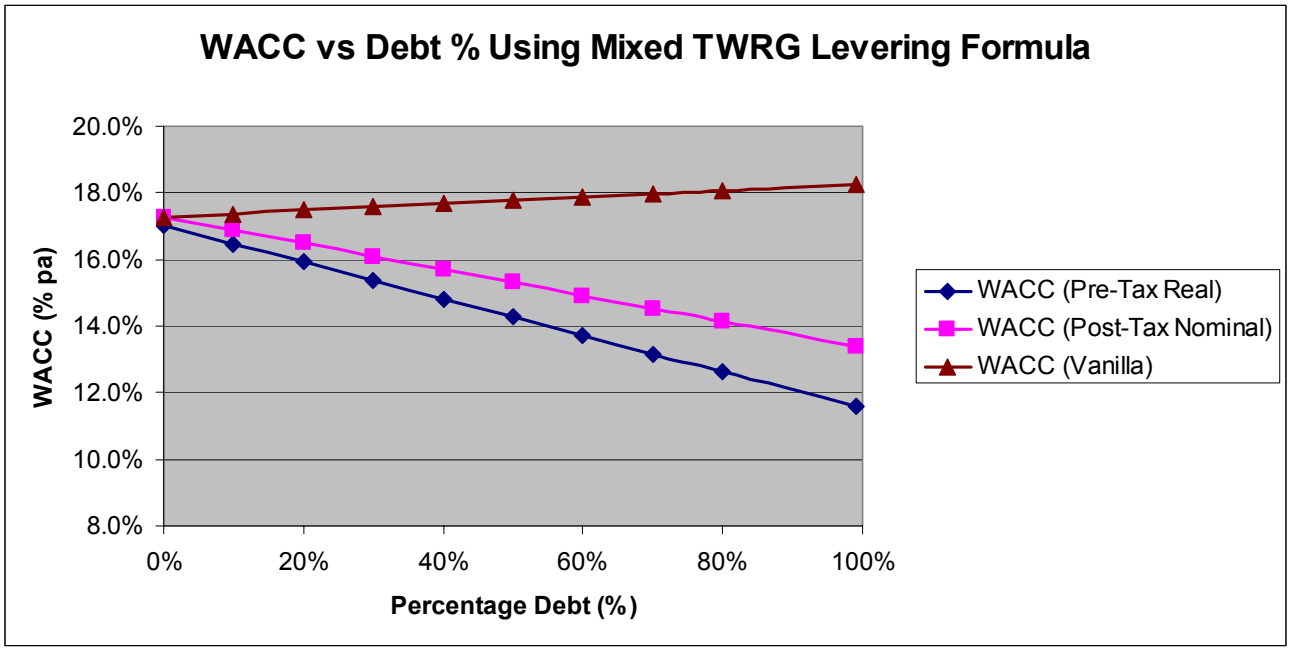


Figure 6.6. : WACC versus Gearing – TWRG Mixed Levering Methodology

6.16.2 The ERC suggests that this rising result as gearing increases is a direct result of the inconsistent de-levering and re-levering formula application provided in the TWRG. The ERC further notes that the TRANSCO / PSALM WACC paper does not raise issues with the mixed levering formula, and the implication is that the applicant believes the revenue cap derived using a 'vanilla' WACC shall follow the same rising curve. ERC suggests that the cash flow tax adjustments required to develop a reasonable post-tax revenue stream may result in a different outcome.

6.16.3 It is also noted that the Professor van Zijl methodology adopts the TWRG levering methodology in this area without critical comment on the principles thus used. Indeed the comments suggest that Professor van Zijl believed that the ERC was using a Harris – Pringle approach and were not following the TWRG methodology as defined.

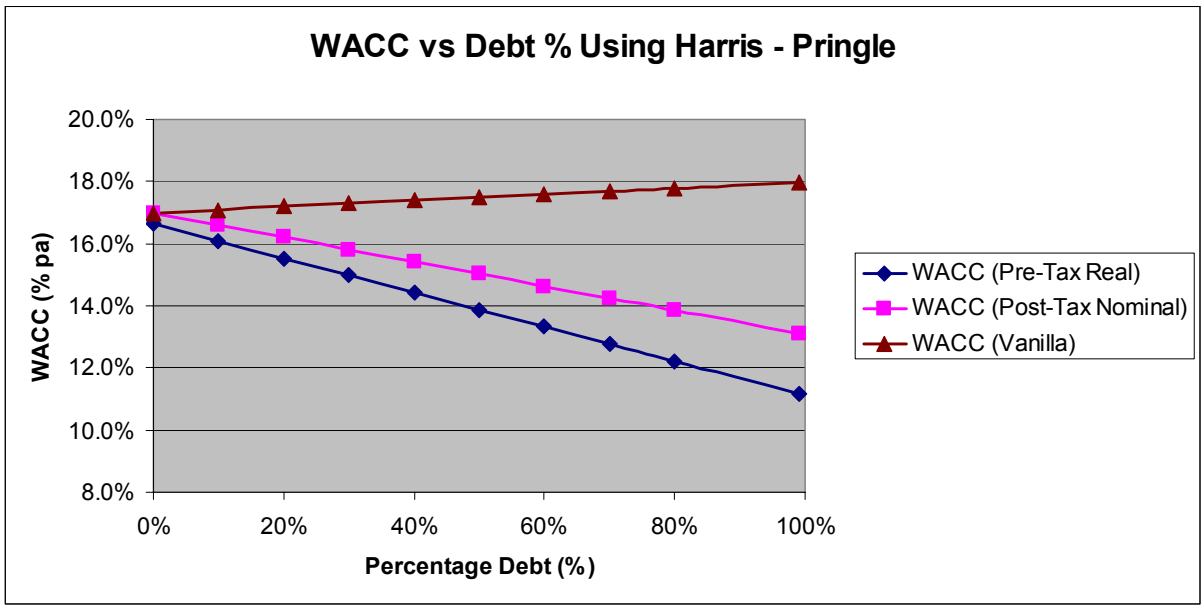


Figure 6.7 : WACC versus Gearing – Harris – Pringle Levering Methodology

6.16.4 Figure 6.7 shows the outcome using the consistent Harris – Pringle methodology. The outcome is again a rising 'vanilla' WACC curve with increasing gearing.

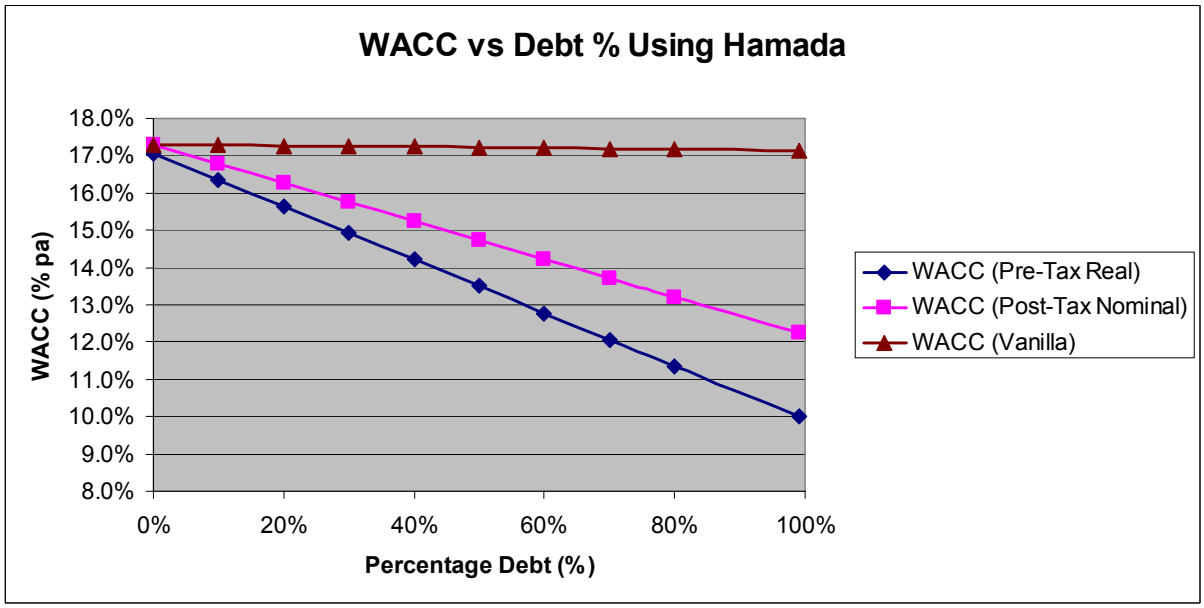


Figure 6.8 : WACC versus Gearing – Hamada Levering Methodology

6.16.5 Figure 6.8 shows the outcome using the consistent Hamada methodology as proposed for the Third Regulatory Period. The outcome is an essentially flat 'vanilla' WACC curve

with increasing gearing. This outcome strongly suggests the Modigliani – Miller (MM) assumptions for the CAPM are properly matched to the other WACC assumptions, as the MM theory suggests the financial structure of a company is irrelevant to the value of a company. This is at present the ERC's conclusion from the discussion in paragraph 6.11.13 above.

6.17 Measured Equity Betas

6.17.1 The equity beta of 0.65 appears high against a larger number of transmission (and distribution) network businesses overseas. A value of 0.58 is preferred and is supported by the latest market information.

6.18 Sovereign Risk Premium Applied to Rf and MRP

6.18.1 The approach proposed by TRANSCO / PSALM incorporates sovereign risk into the risk free rate by use of the yield of the US$ treasury bond issued in the Philippines (which feeds both the cost of equity and cost of debt, and incorporates another escalation for sovereign risk into the MRP used in the cost of equity. It is not clear to the ERC that this does not double compensate equity holders for sovereign risk. ERC believes this is one of the bigger differences between the Professor van Zijl and the ERC methodologies. ERC does not support the double compensation as it is currently understood.

6.19 Upward Value Bias

6.19.1 Professor van Zijl has indicated that in selecting the values for the WACC parameters, he has a preference to use numbers from the higher end of the likely range of values, because the economic detriment or opportunity cost of under-estimating the WACC and hence reducing incentives for investment, far outweighs the additional cost imposed through a slightly higher WACC. The ERC shares the Professor's concern over poor investment signals, but does not believe the bias towards a higher WACC is necessary when the specific risks associated with the TRANSCO business in the Philippines are being well represented in the cash flow forecasts used to develop the building blocks. Hence, the ERC does not support the biasing of data values to the higher end of a likely range for purposes of estimating a regulatory WACC.

6.20 Additional Risk Premium

6.20.1 Professor van Zijl has indicated that he has a preference to add a Additional Risk Premium (ARP) to the WACC generated to compensate for systematic risks, because the regulatory process (and regulatory risk associated with it) and the treatment of single cash flows (rather than probability weighted forecasts) means that there are additional real options value which need to be incorporated to specifically encourage investment in a regulated industry environment. He also suggests that while various experts are now leaning towards this ARP, there is no immediate financial theory to assist with estimating how much this premium should be. He has suggested 2% in this instance.

6.20.2 The ERC does not believe any ARP needs to be applied to the regulatory WACC because the TWRG includes a number of automatic and ex-post (after the event) adjustment processes to the regulated cash flows which mitigate the reality of the additional market frictions, project irreversibility and timing flexibility, and resource constraints, which eliminate the need for an ARP.

6.20.3 Specifically the TWRG provides automatic 5 year efficiency retention provisions, automatic CPI adjustment, automatic CPI and Peso/US$ exchange rate adjustments once certain triggers are met, and automatic revenue cap re-opening provisions, as well as the ability to delay any capex project by up to 18 months without penalty and to advance or substitute higher priority projects with ex-post justification and prudency hurdles which need to be met for inclusion in the rate base.

6.20.4 Professor van Zijl has also indicated in the public hearings that his brief did not include the detailed review of the TWRG provisions or the safeguards embedded in that document, and hence the ERC suggests the WACC methodology he has developed seeks to incorporate reward for all of the risk elements from an electricity transmission business in the WACC and its adjustments, when this is not necessary from examination of a more complete risk compensation assessment.

6.21 Philippines Corporate Tax Rate

6.21.1 The EVAT Law has been passed by Congress and specifies that the corporate tax rate shall be 35% pa for 2006, 2007 and 2008, then 30% pa thereafter. In order for the 'effective' corporate tax rate to be estimated for this period, a discounted cash flow (DCF) analysis was performed using the estimated risk free rate as the discount factor, to derive the tax rate which if applied for five years would have the same impact as the two tiers proposed by the EVAT Law.

6.21.2 This 'effective' tax rate could then be used to estimate the range of regulatory WACC. It should be noted that while the change in corporate tax rate will change the pre and post tax WACC analysis, it does not have any impact on the 'vanilla' WACC analysis. The 'effective' corporate tax rate has been estimated to be 33.4% pa. Table 6.8 shows how this is estimated.

Effective Tax Rate for Five Year Period						
Year	0	1	2	3	4	5
Tax Rate & Shield Value		0.35	0.35	0.35	0.30	0.30
Discount Rate	14.36%	as at end Oct 2005				
PV at Y0		0.31	0.27	0.23	0.18	0.15
Sum PV at Y0	1.13649					
Effective Tax Rate	0.33390	0.33390	0.33390	0.33390	0.33390	0.33390
PV at Y0		0.29	0.26	0.22	0.20	0.17
Sum PV at Y0	1.13649					
Use Goal Seek to get Pink cells to be equal by varying grey cell.						

Source : ERC Analysis.

Table 6.8. : Estimation of the Effective Tax Rate for the Second Regulatory Period Resulting from VAT

6.21.3 This change in government policy does not effect the 'vanilla' WACC estimate. It does have an impact on the other forms of the WACC measurement.

6.22 Timing of Final WACC Estimate

6.22.1 The ERC notes that much of the increase in the regulatory WACC seen between the Issues Paper and the value recommended to the Commission for the Draft Determination paper, results from the increase in the Philippine inflation rate in late 2004 and the better market measure of the CRP. The ERC also notes there is market information which suggests there is an improvement in the Philippines inflation rate and that the impact of the EVAT may be to place pressure which could lead to a reduced CRP, reduced bond yields and reducing relative inflation performance compared to the USA. These positive market features are offset by the concern over higher oil / fuel prices over the northern hemisphere winter and the various trade imbalances which effect both the Philippines and the USA inflation rates.

6.22.2 This uncertainty suggests that a measure of the regulatory WACC using updated market data should be attempted as late as possible in the regulatory reset process. As a counter-balance PSALM has indicated that an earlier 'final' regulatory WACC determination would assist it in the bidding and privatization process. There are a number of options which could be adopted for the timing at which the final market data shall be secured for the regulatory WACC. These options are :

- The end of October 2005 to coincide with the Draft Determination publication;
- December 16, 2005 (with the knowledge that thin Christmas trading may limit the liquidity of market outcomes at the end of December 2005);
- The end of January 2006 as a period with higher trading volumes; or
- Given the current timetable for the reset process has a Formal Offer of Evidence at the end of February 2006, use this date.

6.22.3 The ERC suggests any later dates than provided in the options above would be unworkable given the other inputs and approvals which are required to develop a Final Decision on the revenue cap for the Second Regulatory Period.

6.22.4 The ERC has accepted that market data be derived as at end of January 2006, and that the interim final regulatory WACC be decided and communicated to the industry by end February 2006. This slightly early publication of the regulatory WACC would assist the privatization bid process without necessarily harming the overall revenue cap process.

7

CHAPTER 7

ARR ANALYSIS

7.1 Approach to Modelling of ARR

7.1.1 The ERC has adopted the approach outlined in the TWRG for the development of the annual revenue requirement (ARR) base on a building block approach to forecast regulated revenue.

7.1.2 A model has been developed of the TWRG revenue building block methodology to assist ERC in its analysis. The data used for input to this model for the Draft Determination has been described in elsewhere in this report.

7.1.3 While the model has provided the basis for the Draft Determination, it will require additional work so that it is in a form to provide the additional inputs required by the ERC for its final decision.

7.2 TRANSCO / PSALM Approach

7.2.1 TRANSCO / PSALM's approach in basic form follows the TWRG. However, it adds an additional working capital claim associated with the timing of its tax payments on a quarterly basis rather than an annual basis in arrears, which is assumed by the TWRG.

7.2.2 The primary assumptions used by TRANSCO / PSALM for the estimate of the ARR for their filing are as follows:

(a) A vanilla WACC of 21.98% pa (approximately 22% pa as applied for);

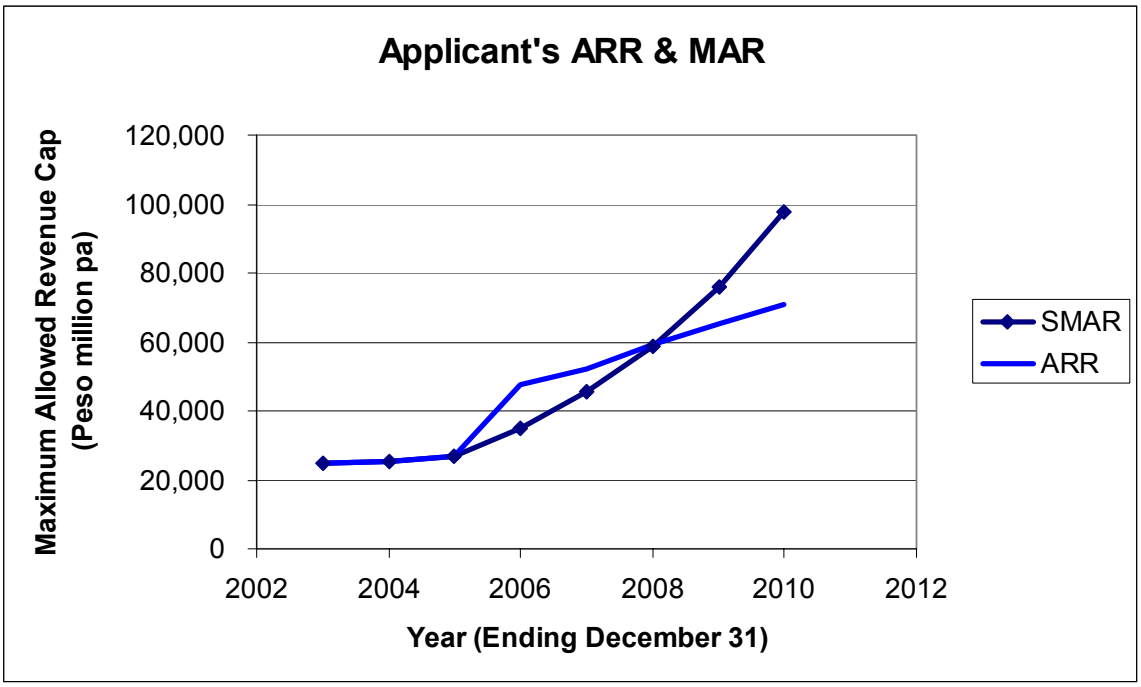
(b) An assumed working capital investment equaling 7.6% of the opex each year (upon which TRANSCO gets a return on investment at the vanilla WACC);

(c) A working capital adjustment associated with the difference between the TWRG assumption of tax cash flows occurring in the following year, and TRANSCO / PSALM's claimed cash flow requirement associated with tax payments on a quarterly basis (again upon which TRANSCO gets a return on investment at the vanilla WACC);

(d) Various assumptions over the applicable tax rates (other than corporate income tax) of between 12.6% and 23% of the opex costs per annum, primarily focused on TRANSCO being taxed as if it was fully owned by a concessionaire from the beginning of 2006;

(e) The assumption that the corporate income tax rate is 35% pa for 2006 to 2008 and then 30% pa, and that TRANSCO is a full tax paying entity for the beginning of 2006.

7.2.3 Figure 7.1 shows the outcomes of the TRANSCO / PSALM application for a new revenue cap.



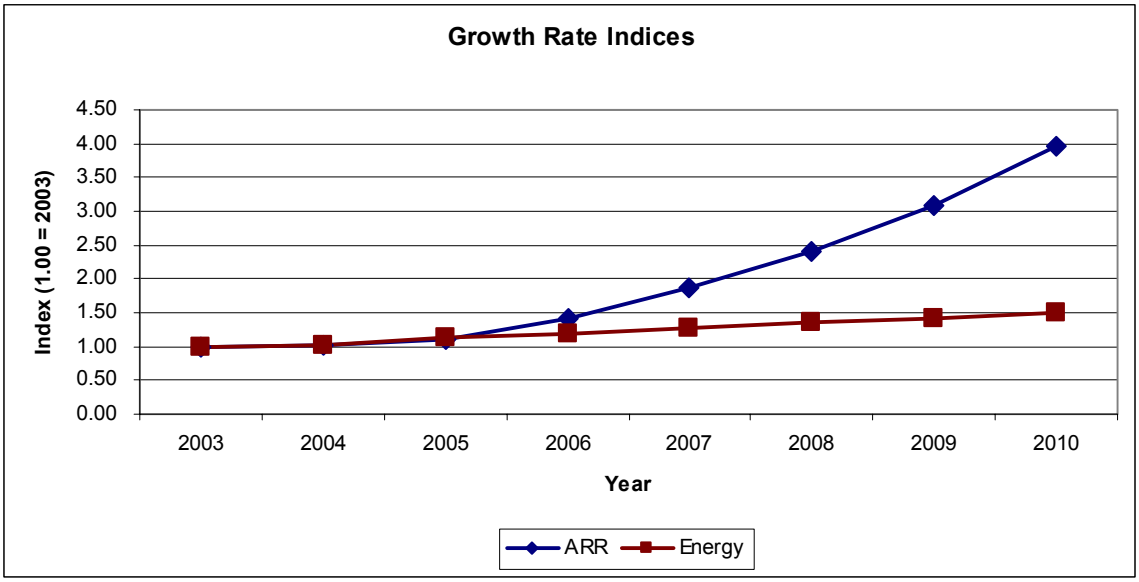
Source : ERC Analysis.

Figure 7.1 : TRANSCO /PSALM's Application for ARR and MAR

7.2.4 The TRANSCO / PSALM application for ARR rises from the 2005 MAR cap of PhP27,086 million to PhP 47,362 million (a 74.9% increase between 2005 and 2006 on an unsmoothed basis).

7.2.5 Where the revenue cap is smoothed and there is no Po applied, the revenue requirement rises rapidly with an estimate of PhP 97,157 million revenue cap in 2010, using the TRANSCO / PSALM assumptions for the revenue modelling.

7.2.6 Figure 7.2 shows the growth in forecast energy using the ERC assumptions in growth, compared to the TRANSCO / PSALM application for the MAR revenue cap, using an index of 1.0 in 2003. As can be seen the application for revenue outstrips the forecast growth in energy delivery through the transmission system by a factor of about 150% by 2010.



Source : ERC Analysis.

Figure 7.2 : Growth in Forecast Energy vs TRANSCO /PSALM's Application for MAR

7.2.7 The detail of the TRANSCO / PSALM filing is provided in Table 7.1 below. The significant jump in proposed revenue from 2005 to 2006 is shown.

TRANSCO (Peso million, nominal) Building Block	2005 (*)	2006	2007	2008	2009	2010
Operation Expenditure		5,401	5,932	6,774	7,285	7,854
Corporate Tax		-	1,218	4,187	8,055	11,583
Other Taxes		682	944	1,201	1,489	1,805
Return on Capital		35,835	38,314	40,785	41,921	42,898
Regulatory Depreciation		5,444	5,895	6,202	6,409	6,622
ARR	**27,086**	**47,362**	**52,303**	**59,148**	**65,159**	**70,761**

(*) Note : This number is the approved MAR for 2005

Table 7.1 : TRANSCO /PSALM's Application for ARR

7.2.8 The following are highlights of the TRANSCO / PSALM application:

(a) Nominal ARR increases by 74.9% from the revenue cap for 2005 (at PhP 27,086m) to the requested revenue cap in 2006 (at PhP 47,362 m);

(b) The primary reasons for the increase in the ARR relate to the WACC, opex forecast increases, capex forecast, income tax inclusion, adjustments to the opening RAB, and others financial adjustments which all need to be carefully reviewed.

(c) TRANSCO / PSALM's application of a 22% WACC also has a significant impact. This WACC was not arrived at using the Issues Paper methodology. It adopted a different approach which includes additional return to cover exchange rate risk and

other company specific risks, which the TWRG has factored into the cash flows, and hence would be double counted through using TRANSCO / PSALM's WACC with the ERC's TWRG building block and other regulatory safeguards.

(d) The strongly escalating opex (75.8% over 5 years, about 15% pa) results from the use of overseas transmission business benchmarks, which may not be correctly adjusted for an "apples-to-apples" comparison. Recalibration of the benchmarks should provide a better benchmark. Also, payroll represents 43.0 % of the total opex (for 2004) and a salary survey has been used to propose increases in salary without a large decrease in head count. This reduction in productivity appears to reduce the TRANSCO efficiency rather than improving it.

(e) The capex is increasing in percentage terms at a lower rate (12.0% over 5 years, about 2% pa) than the system peak load (about 5% pa), suggesting the overall "new" capex forecast may not be excessive. However, inclusion of completed and partially completed capex projects, not previously "approved" by the ERC will require close analysis and scrutiny.

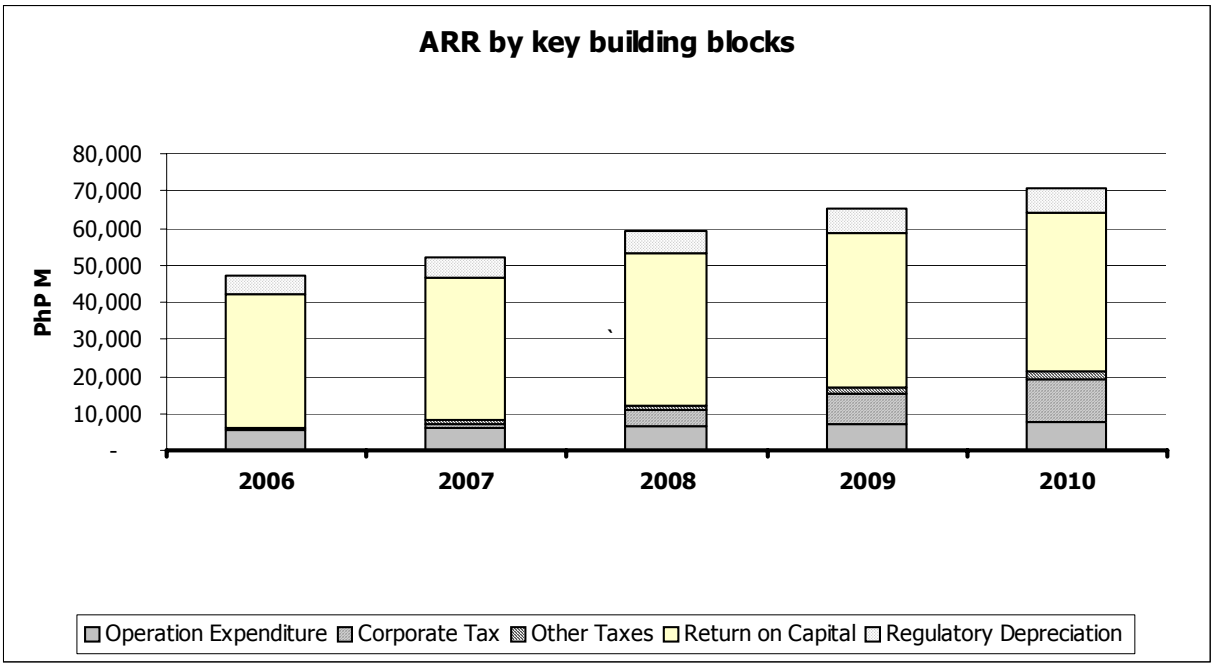
(f) The inclusion of income tax as per the new VAT law (35% for 2006 through 2008, 30% from 2009), which is as proposed by the TWRG, but counter to initial discussions with TRANSCO / PSALM which suggest TRANSCO will likely begin to pay corporate income tax related to 2008, but that it is likely to pay 0% related to 2006 and 2007.

(g) An increase in the RAB has occurred through valuation of the asset base at December 31, 2004 (the first since 1996), so that the starting value is PhP133.656 billion (a 41% increase over its Net Book Value at the same date of PhP94.921 billion). This revaluation is necessary and mandated by the TWRG. The Independent Expert has included a number of optimizations in arriving at the ODRC value it believes is reasonable.

(h) TRANSCO / PSALM has included the connection assets in the RAB even though it is seeking to have these assets treated as excluded services under the TWRG. TRANSCO / PSALM has included the sub-transmission assets within the RAB but only disposals for the 2005 and 2006 year, which do not fully represent all of the forecast disposals over the Second Regulatory Period. An updated forecast has been provided by TRANSCO in a supplementary submission requested by the Commission in the public hearing processes in December 2005.

(i) There are a number of other financial adjustments undertaken by TRANSCO / PSALM which the ERC believe requires further additional scrutiny. These include changes to regulatory asset lives, financial adjustment for difference between TWRG tax payment timing assumptions and actual tax payment timing, and others such as additional CWIP to accommodate ongoing capex projects.

7.2.9 The detail of the TRANSCO / PSALM building block outcome is shown in Figure 7.3 below.



Source : TRANSCO / PSALM filing.

Figure 7.3 : TRANSCO /PSALM's Building Block Application for ARR

7.3 ERC's Approach and Outcome for the Draft Determination

7.3.1 The primary assumptions used by ERC for the estimate of the ARR for the Draft Determination are as follows:

(a) A vanilla WACC of 15.44% pa;

(b) An assumed working capital investment equaling 6% of the opex for 2005, 5% for 2006, 4% for 2007, 3% for 2008, 2.5% for 2009 and 2% for 2010 (upon which TRANSCO gets a return on investment at the vanilla WACC);

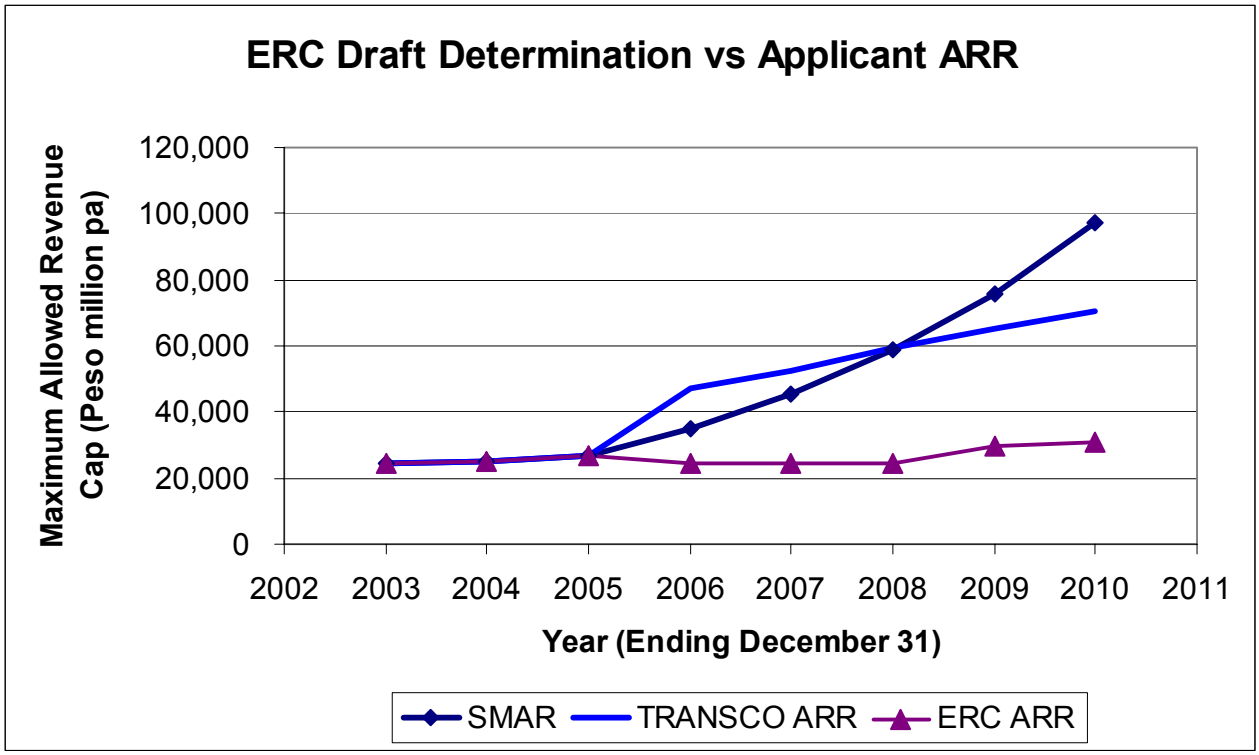
(c) A working capital adjustment associated with the difference between the TWRG assumption of tax cash flows occurring in the following year, and TRANSCO / PSALM's claimed cash flow requirement associated with tax payments on a quarterly basis has been set to zero, as the ERC is concerned that the adjustment is not necessary and that the analysis presented by TRANSCO / PSALM over estimates any effect of cash flow difference;

(d) The applicable tax rates (other than corporate income tax) are set to 0% of the opex costs per annum, as further analysis of the tax rates is required;

(e) The assumption that the corporate income tax rate is 35% pa for 2006 to 2008 and then 30% pa, and that TRANSCO is not a full tax paying entity until the beginning of 2008 year, with payments occurring in the following year; and

(f) Alternative approaches to Opex forecasts, the opening RAB and capex project approval and capex forecasts, described in the other Chapters of this report.

7.3.2 Figure 7.4 shows the outcomes of the ERC for a new ARR unsmoothed revenue caps for the Second Regulatory Period, overlayed onto the TRANSCO / PSALM application.



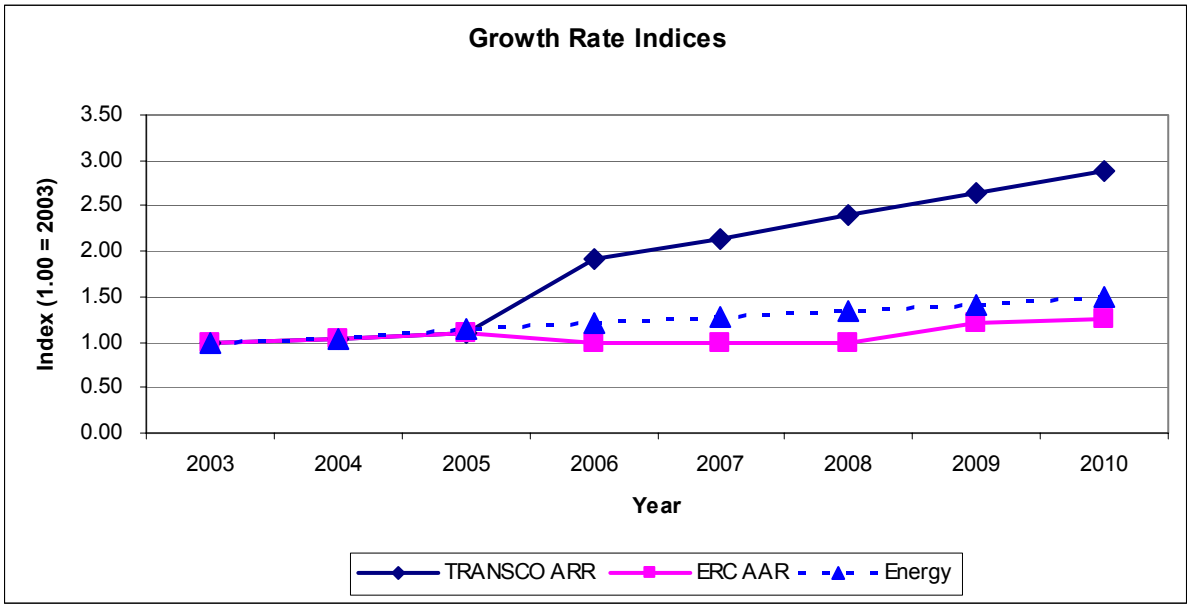
Source : ERC Analysis.

Figure 7.4 : ERC's Analysis for the Draft Determination vs TRANSCO /PSALM's Application for ARR and MAR

7.3.3 The ERC's analysis for ARR falls from the 2005 MAR cap of PhP27,086 million to PhP 24,563 million (a 10.1% fall between 2005 and 2006 on an unsmoothed basis).

7.3.4 Over the Second Regulatory Period, the ERC analysis for the Draft Determination has an approximately level revenue requirement rising slightly with an estimate of PhP 30,618 million revenue requirement in 2010, using the ERC assumptions described throughout this report.

7.3.5 Figure 7.5 shows the growth in forecast energy using the ERC assumptions in growth and ARR outcomes, compared to the TRANSCO / PSALM application for the ARR revenue requirement, using an index of 1.0 in 2003. As can be seen the ERC's analysis for revenue falls somewhat below the forecast growth in energy delivery through the transmission system rising to approximately the same level as energy growth by 2010.



Source : ERC Analysis.

Figure 7.5 : Growth in Forecast Energy vs ERC's ARR Analysis and TRANSCO /PSALM's Application for ARR

7.3.6 The return on capital is calculated as required by the TWRG. The WACC is multiplied by the sum of the both the allowed working capital requirement plus the average of the opening and closing RAB. Table 7.2 summarises the calculation for the Draft Determination.

		2004	2005	2006	2007	2008	2009	2010
Inflation Index								
Index from Inflation assumption		1.00	1.05	1.10	1.15	1.20	1.26	1.31
Regulatory Period WACC								
WACC	(% pa)		15.44%	15.44%	15.44%	15.44%	15.44%	15.44%
Regulatory Building Block (nominal)								
Working Capital (Approved)	Peso Millions		220.7	165.5	141.8	113.2	100.1	84.4
RAB (Average of Opening & Closing)	Peso Millions		107,605.7	103,657.6	101,649.4	100,164.8	98,190.8	95,030.5
Capital for Return	Peso Millions		107,826.4	103,823.1	101,791.2	100,278.0	98,290.9	95,114.9
Return on RAB (ie WACC* [ODRC+WC])	Peso Millions		16,647.3	16,029.3	15,715.5	15,481.9	15,175.1	14,684.8

Table 7.2 : ERC's Analysis of Return on Capital

7.3.7 The detail of the ERC analysis is provided in Table 7.3 below. The fall in proposed revenue from 2005 to 2006 is shown.

7.3.8 The inputs used by the ERC in this analysis are described throughout this report. The prime differences between the ERC and TRANSCO / PSALM analysis are as follows:

(a) A lower vanilla WACC at 15.44% pa;

(b) A lower opening RAB for December 31, 2005, lower than the TRANSCO / PSALM application by 34.2%;

(c) A lower opex forecast by approximately 36.9% less than the TRANSCO / PSALM application in 2006 reducing to 14.0% less in 2010;

(d) Lower capex forecasts with only 14.3% of the initial 2005 capex being included in the rolled-forward RAB, and a lower capex forecast by approximately 74.6% in 2006 to 80.4% in 2010;

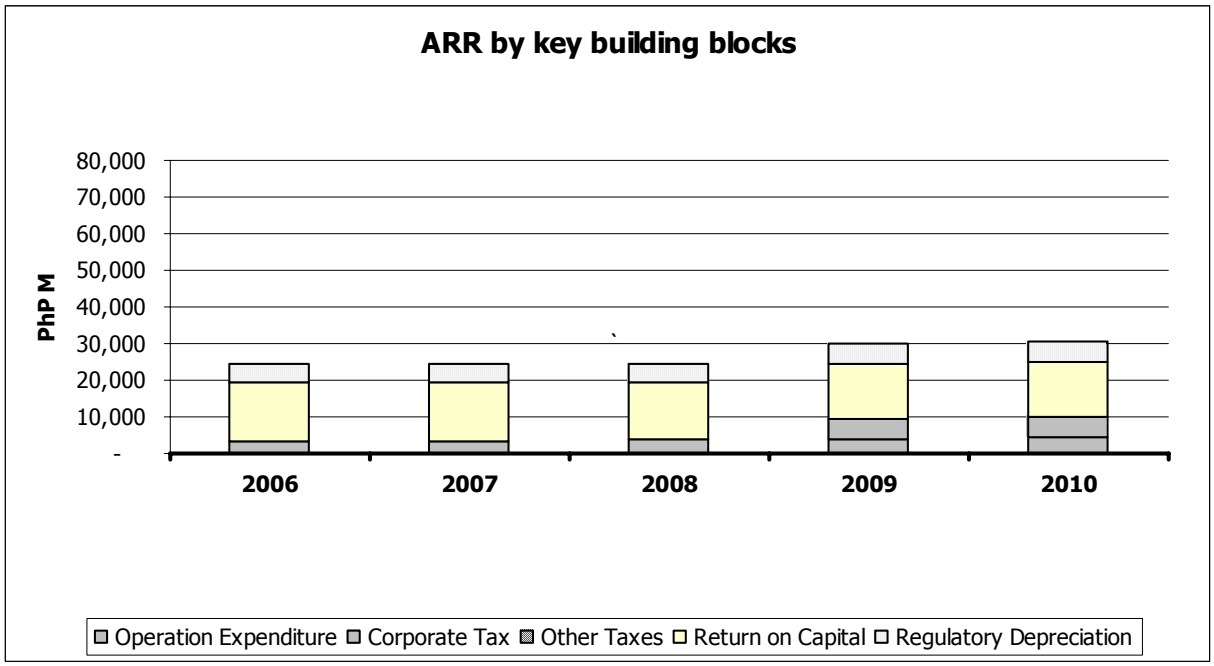
(e) The exclusion of other taxes for the full regulatory period; and

(f) The exclusion of recovery of corporate income tax costs for the 2006 and 2007 years.

ERC (Peso million, nominal) Building Block	2005 (*)	2006	2007	2008	2009	2010
Operation Expenditure		3,311	3,545	3,773	4,006	4,222
Corporate Tax		-	-	-	5,203	5,939
Other Taxes		-	-	-	-	-
Return on Capital		16,029	15,716	15,482	15,175	14,685
Regulatory Depreciation		4,997	5,157	5,371	5,569	5,773
ARR	**27,086**	**24,337**	**24,418**	**24,627**	**29,953**	**30,618**

Table 7.3 : ERC's Analysis of ARR

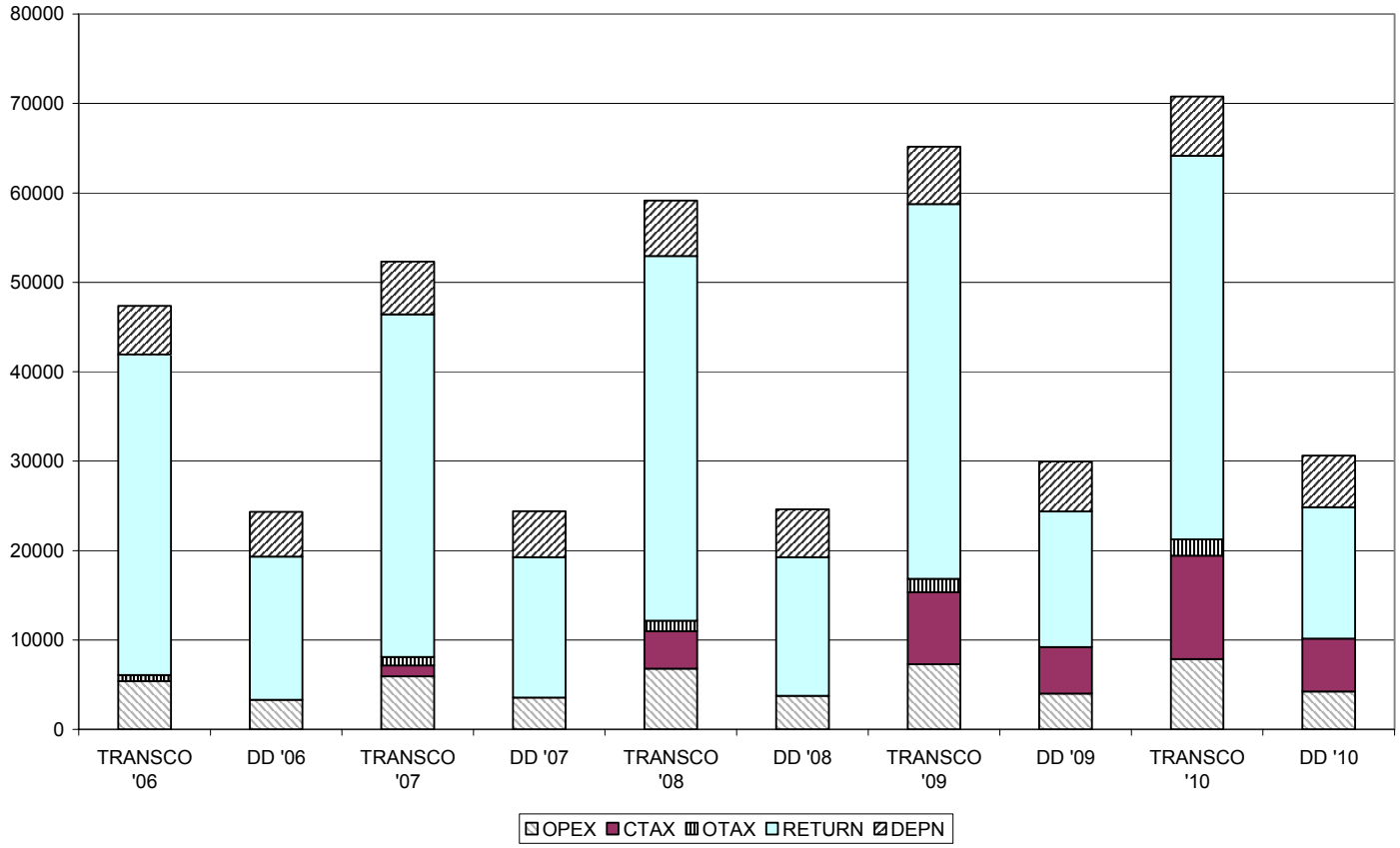
7.3.9 The detail of the ERC building block outcome is shown in Figure 7.6 below.



Source : ERC Analysis.

Figure 7.6 : TRANSCO /PSALM's Building Block Application for ARR

7.3.10 A comparison between the ERC's Draft Determination ARR and TRANSCO / PSALM's application is provided in Figure 7.7 below.



Source : ERC Analysis.

Figure 7.7 : Comparison of ERC and TRANSCO /PSALM ARR

7.4 Treatment of Corporate Income Tax

7.4.1 The tax status of TRANSCO will change when a concessionaire begins to manage the business, and later when it is granted a franchise. The ERC has assumed that TRANSCO remains exempt from corporate income tax for the 2006 and 2007 years. In the 2008 year an income tax liability of PhP 5,465 is assumed to accrue, which is also assumed to be paid in 2008.

7.5 Treatment of Other Taxes

7.5.1 For the Draft Determination, the ERC has assumed the other taxes which are required to be paid are zero. It has taken this step as additional analysis of the tax payments (other than corporate income tax) is required to ensure that TRANSCO / PSALM does not over-recover for these tax payments. The level of these taxes and the way there are estimated will be subject to further review before the final determination.

7.6 Treatment of Po for Draft Determination

7.6.1 The ERC has not undertaken the smoothing of the ARR for the Draft Determination. Smoothing allows the ERC to better assess and manage potential price changes experienced by customers of TRANSCO and hence end-user consumers. One of the prime inputs to the revenue smoothing required is the opening revenue cap which has to be decided under the provisions of Article III of the TWRG.

7.6.2 Clause 1.6.7 (b) of the Issues Paper describes the approach to the rate verification and adjustment process for the 'initial' period of 2006, prior to the ERC's final determination. To summarize the revenue cap provisions of the First Regulatory Period are carried forward and applied during the annual validation and adjustment of tariff rates under Article VI of the TWRG which is scheduled to occur between October 1, 2005 and December 31, 2005. The revenue cap for the start of 2006 will be set where the X factor equals zero. Following the final determination on the regulatory reset for the 2006 to 2010 period, the Po and X Factor will be set for the overall 2006 year and for subsequent years of the Second Regulatory Period.

7.6.3 The ERC has not analysed a Po or the X Factor for the Draft Determination as the inputs required for this analysis are not yet firm. A Po adjustment will most likely be required for the final determination of the X Factor.

7.7 The Development of an ARR Outcome for the Final Determination

7.7.1 The ERC is of view that considerable additional justification is required from TRANSCO / PSALM before there is sufficient evidence to allow the inclusion of a number of the elements of the asset base, opex forecast, capex forecast, RAB adjustments and other elements within its application. Such justification must be new in nature and provide further material upon which the ERC can assess the reasonableness of the TRANSCO / PSALM claims. TRANSCO / PSALM is advised that a pure re-statement of the information which has currently been provided to the ERC will not be sufficient for the ERC's needs in further assessment of the application.

7.7.2 The ERC seeks feedback on its approach to developing an ARR for TRANSCO, including all elements of the analysis as described in Article IV of the TWRG and the initial approach adopted for the Draft Determination within this report.

8

CHAPTER 8

PERFORMANCE BASED REGULATION

8.1 Approach to PIS

8.1.1 One of the main features of Performance Based Regulation is the Performance Incentive Scheme (PIS). Section 8.2 of the TWRG provides the guidelines for the development of the PIS. This Regulatory Reset Process for the Second Regulatory Period of the TWRG shall establish the Performance Indicators (PIs) and their respective benchmarks against which TRANSCO's performance will be monitored to determine whether it will be rewarded or penalized.

8.2 TRANSCO / PSALM's Approach

8.2.1 Existing Performance Measures of TRANSCO:

8.2.2 The National Transmission Corporation (TRANSCO) when it is still part of the National Power Corporation (NPC) had been monitoring and recording transmission line and substation equipment outages since 1998 on a corporate level to asses its performance on a monthly, quarterly and yearly basis. TRANSCO as a separate entity continues to record and monitor these outages. In September 2003, TRANSCO reclassified these outages by issuing Circular No. 2003-50 which updated, segregated further in details and defined the different classification of transmission, sub-transmission lines and substation equipment outages.

8.2.3 Further in September 2004, Circular 2004-52 was issued as an addendum to Circular 2003-50 that stipulates the implementing rules and regulation of the new classification of outages. Circular 2004-52 was developed primarily to:

1. identify the root causes of these outages and its corresponding definition thereof;
2. set the rules and regulation in charging the appropriate unserved energy against responsible groups/units; and
3. provide guidelines in the accomplishment of Spot, Root Cause Identification and Classification Outage reports.

8.2.4 The Circular also classifies other outages caused by external factors beyond the control of TRANSCO. The manner of documenting the proofs or evidence that these outages really happened and the conditions prevailing during the occurrence of the faults are also specified.

8.2.5 TRANSCO has established data of its performance indicators for Luzon, Visayas and Mindanao using the available data collated for the seven year period ending 2004. These data are shown in the tabulations of Appendix C, Tables C.1 and C.2.

8.2.6 The performance indicators established by TRANSCO using these gathered data are as follows:

1. Number of Interruption Events (NIE);
2. System Average Interruption Frequency Index (minutes) (SAIDI);
3. Sustained Average Interruption Frequency Index (SAIFI);
4. Momentary Average Interruption Frequency Index (MAIFI);
5. System Interruption Severity Index (minutes) (SISI);
6. Frequency of Tripping per 100 circuit km (trip/100 ckt-km) (FOT);
7. Average Outage Duration (minutes per trip) (AOD);
8. Frequency Limit Compliance (FLC); and
9. Voltage Limit Compliance (VLC).

8.2.7 TRANSCO has already submitted similar indicative figures from 1998 to 2002 to ERC as published in the Regulatory Reset Issues Paper.

8.3 Proposed Performance Indicators (PI)

8.3.1 In the Issues Paper, eight (8) performance indices were proposed for the Performance Incentive Scheme. In the application, TRANSCO / PSALM proposed five (5) performance indices that will be used as basis for computing the performance incentives under the Performance Based Regulation for the Second Regulatory Period. The said performance indices are summarised in Table 8.1 as follows:

No.	Issues Paper	TRANSCO Proposal	
		Measure	**Positive / Negative Measure**
1	Number of interruption events (NIE)		
2	Average Sustained Interruption Frequency Index (ASIFI)		
3	Momentary Average Interruption Frequency Index (MAIFI)		
4	Average Sustained Interruption Duration Index (ASIDI)		
5	System Interruption Severity Index (SISI)	System Interruption Severity Index (SISI)	Negative
6	Number of Frequency Limit Violations (FLV)	Frequency Limit Compliance (FLC)	Positive
7	Number of Voltage Limit Violations (VLV)	Voltage Limit Compliance (VLC)	Positive
8	System Losses		
9		Frequency of Trippings per 100ckt-km (FOT/100ckt-km)	Negative
10		System Availability (SA)	Positive

Table 8.1 : Comparison of ERC and TRANSCO /PSALM PIS

8.3.2 The Number of Interruption Events (NIE) is being proposed to be replaced with Frequency of Tripping per 100 circuit kilometers (FOT). FOT was originally included in the "Appendix A – Performance Indices and Metrics" of the TWRG and differentiates the relative length of the transmission line.

8.3.3 The other performance indicators, ASIFI, MAIFI and ASIDI were excluded because they only apply to distribution utilities. IEEE Std. 1366-2001 "IEEE Guide for Electric Power Distribution Reliability Indices" particularly mentioned that these indices are intended to apply to distribution system, substations, circuits and defined regions. Furthermore, per Australian Competition and Consumer Commission (ACCC) paper, ASIFI and ASIDI are not recommended performance measures because these indices are deemed statistically unsound.

8.3.4 Moreover, Frequency Limit Violations (FLV) and Voltage Limit Violations (VLV) have been changed to Frequency Limit Compliance (FLC) and Voltage Limit Compliance (VLC). The frequency and voltage limit violations have somewhat outlived its relevance. These indicators are rather vague and confusing since they use Binary Point Score (BPS) system and may not correctly gauge the level of compliance with the frequency and voltage limits prescribed in the Philippine Grid Code. The BPS threshold values on FLV and VLV are arbitrary and may have no sound basis.

8.3.5 System Loss was omitted from the list and replaced with System Availability. Transco argues that Technical losses which constitute the bulk of the system losses are beyond its control. These losses depend heavily on the location of generating plants supplying power to the load centers. The nearer the generating plants that are supplying load to the load center the lower will be the system losses. To replace Systems Loss, Transco considered System Availability as an internationally used performance measure.

8.3.6 The following are the definitions/formula of the proposed Performance Indicators:

1. System Interruption Severity Index (SISI) – this indicator measures the ratio of the unserved energy to the system peak load. Mathematically, it is expressed as:

$$\text{SISI} = \frac{\text{Total Delivery Point Unserved Energy}}{\text{System Peak Load (MW)}}$$

2. Frequency of Trippings per 100ckt-km (FOT/100ckt-km) – measures the number of forced line outages (transient and permanent or sustain) initiated by automatic tripping of relay.

$$\text{FOT} = \frac{\text{Total Number of Trippings}}{\text{Circuit Length per } 100\text{ckt} - \text{km}}\text{; for voltage level 69kV and above}$$

3. System Availability (SA) – is defined by the following formula:

$$\text{SA} = \frac{\text{The sum for all circuit of hours available}}{\text{(Number of circuits) x (Number of hours in Period)}}$$

Mathematically:

$$\text{SA} = \frac{N \bullet P - \sum_{i=1}^{n} \left[(ODC_1 - OEC_1) + (ODC_2 - OEC_2) + (ODC_3 - OEC_3) + \ldots + (ODC_n - OEC_n) \right]}{N \bullet P} \text{ x } 100\%$$

Where:

SA	= System Availability[19], in %
N	= Total number of components[20]
P	= Period covered, in minutes[21]
n	= Total number of components on outage
i	= Component on outage
ODC	= Outage Duration of Component, in minutes
OEC	= Outage Exemption of Component[22]

Table 8.2 : SA Definitions

4. Frequency Limit Compliance (FLC) – refers to the percentage of time during the rating period that the system frequency is within the allowable range of 60 ± 0.3 Hz. It is expressed, as follows:

$$FLC = \left[1 - \frac{(n_1 * r)}{(d * 24 * 60 * 60)}\right] x\ 100$$

Where: n_1 = total number of frequency limit violations

r = scanning rate of the SCADA/EMS, in seconds

(2 secs. in Luzon starting 2002 and 4 secs. before 2002)

d = number of days in rating period

5. Voltage Limit Compliance (VLC) – refers to the percentage of the number of voltage measurements during the rating period that the voltage variance did not exceed ± 5% of the nominal voltage of all busses (Luzon – 230 kV & 500 kV, Visayas – 230 kV/138 kV, Mindanao – 138 kV) monitored at the high side of the substation. Monitoring time

[19] System Availability is the availability or the percentage the System being considered is on-line during the study period.

[20] A component refers to critical transmission line or power system equipment e.g. transformer.

Components can be classified or grouped according to:

a. Grid e.g., Luzon, Visayas, or Mindanao;
b. Voltage level e.g., 500kv, 230kv, 115kV, 69kV, etc; and
c. Regions, Districts or Transco-wide.

[21] This is may be by weekly, monthly, quarterly, semi-annually, and annually or any desired duration converted in minutes.

[22] Default is zero. Values depend on the exemptions as referred to the outage classification currently implemented by Transco.

at peak load hours of 11 am, 2 pm and 7 pm and off-peak hour at 2 am. These hours represent the times when the bus voltages are expected to be not in their normal levels.

$$VLC = \left[1 - \frac{n_v}{(d * 4 * n_s)}\right] x\ 100$$

Where: n_v = total number of frequency limit violations

n_s = number of substations

d = number of days in rating period

8.4 Targets & Deadbands

8.4.1 Clause 10.4.2 of the Grid Code indicates that the "initial targets shall be set to the mean value of the particular Grid's reliability performance for the last five (5) year" The targets which are set for monitoring purposes and those which are set for PIS purposes could be different, as suggested by Clause 7.2.2 of the Issues Paper. In its application, TRANSCO / PSALM has effectively proposed the average of the various PI over the last five years as the "target" against which it will be judged, and against which the PIS will draw its reference deadbands.

8.4.2 Each performance indicator will have a profile graphs as shown below that will have a deadband for the targets and a provision for asymmetric caps and collars. The cap is the maximum limit for reward while collar is the maximum limit for penalty.

Positive Measure

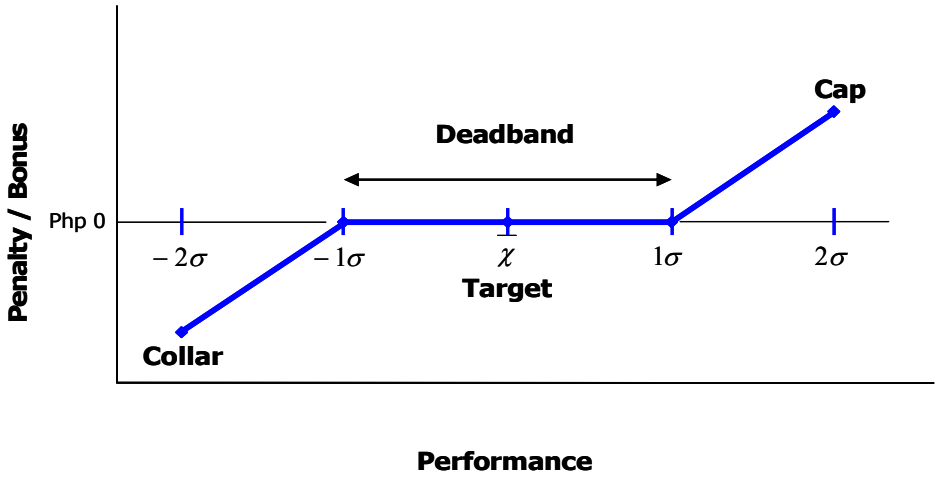


Figure 8.1 : Positive PIS Reference Profile

Negative Measure

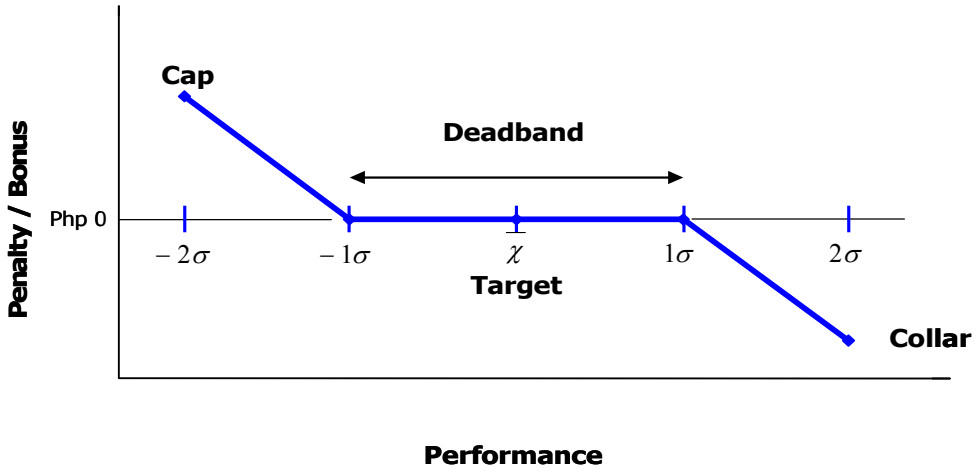


Figure 8.2 : Negative PIS Reference Profile

Annex C of Appendix C shows the actual graph for each of the five (5) proposed PIS.

8.4.3 In the design of the PIS the limits stipulated in Section 8.2 of the TWRG have been considered. The rewards and penalties for the regulatory year should not exceed 3% of the ARR. The deadband for the performance targets has been set within ± one (1) standard deviation from the mean, as shown in the above graphs. Annex B of Appendix C shows the tabulation of the values of deadbands, caps and collar of the proposed rewards and penalties of the various Performance Incentive Schemes.

8.5 Proposed Performance Incentive Scheme

8.5.1 The Performance Incentive Scheme (PIS) being proposed is as follows:

Performance Indicator	Weighted Percentage, %
1. System Interruption Severity Index (SISI)	30
2. Frequency of Tripping per 100 ckt-km (FOT/100ckt-km)	25
3. System Availability (SA)	25
4. Frequency Limit Compliance (FLC)	10
5. Voltage Limit Compliance (VLC)	10

Table 8.3 : Proposed Weighted Percentage

8.6 Options to be Considered:

On the Performance Measures:

8.6.1 Table 2 provides a summary of the performance measures suggested by the ERC in its Issues Paper, which are compared to the performance measures proposed by TRASNCO / PSALM in its application.

No.	Issues Paper	TRANSCO Proposal		Quality	Reliability
		Measure	Positive / Negative Measure		
1	Number of interruption events (NIE)				✓
2	Average Sustained Interruption Frequency Index (ASIFI)				✓
3	Momentary Average Interruption Frequency Index (MAIFI)				✓
4	Average Sustained Interruption Duration Index (ASIDI)				✓
5	System Interruption Severity Index (SISI)	System Interruption Severity Index (SISI)	Negative		✓
6	Number of Frequency Limit Violations (FLV)	Frequency Limit Compliance (FLC)	Positive	✓	
7	Number of Voltage Limit Violations (VLV)	Voltage Limit Compliance (VLC)	Positive	✓	
8	System Losses			✓	
9		Frequency of Trippings per 100ckt-km (FOT/100ckt-km)	Negative		✓
10		System Availability (SA)	Positive		✓

Table 8.4 : Summary of PIS under the ERC Issues Paper and the TRANSCO / PSALM Application

On the Targets:

8.6.2 Clause 10.4.2 of the Grid Code indicates that the *"initial targets shall be set to the mean value of the particular Grid's reliability performance for the last five (5) year"* The targets which are set for monitoring purposes and those which are set for PIS purposes could be different, as suggested by Clause 7.2.2 of the Issues Paper. In its application, TRANSCO / PSALM has effectively proposed the average of the various PI over the last five years as the "target" against which it will be judged, and against which the PIS will draw its reference deadbands.

8.6.3 The ERC suggests that this approach may cause some concern, particularly where poor performance in the latter years of the PI data has occurred. There are a number of options which could be considered by the Commission for the setting of the performance targets to be used for those PI which appear in both the Grid Code and the PIS. These are:

- Choose the mean of the last five years measured PI (implied in the application);
- Choose the median of the last five years measured PI;
- Choose the "best" value the last five years measured PI (where "best' is the most favorable performance);
- Choose the "best" of the mean or the last year's measure of PI (where "best" is the most favorable performance).

On the Deadband:

8.6.4 As stated in paragraph 7.2.1 of Issues Paper, Clause 10.4.2 of the Grid Code indicates that the *"initial targets shall be set to the mean value of the particular Grid's reliability performance for the last five (5) years. The upper and lower cut-off points shall be set at plus or minus one (±1) standard deviation from the mean value"*.

8.6.5 Five (5) options were explored by the ERC, these are:

1. Plus and minus one (±1) Standard Deviation;
2. Plus and minus one-half (±1/2) Standard Deviation;
3. Plus one (+1) and minus one-half (-1/2) Standard Deviation;
4. Plus one and one-half (+1½) and minus one-half (-1/2) Standard Deviation; and
5. Plus two (+2) and minus one-half (-1/2) Standard Deviation

These may be represented graphically as:

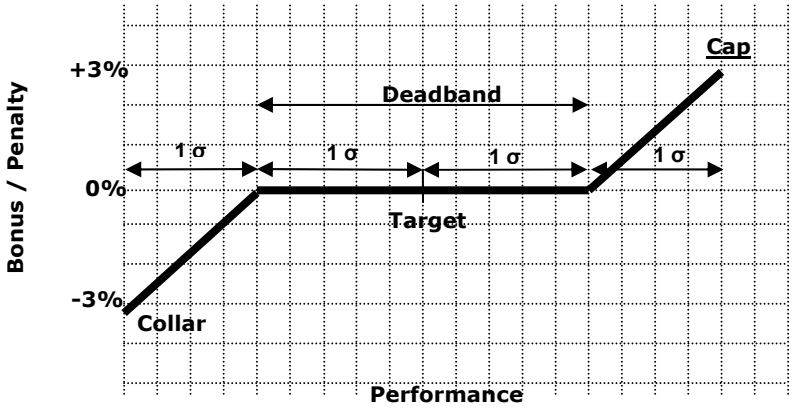


Figure 8.3 : Plus and minus one (±1) Standard Deviation

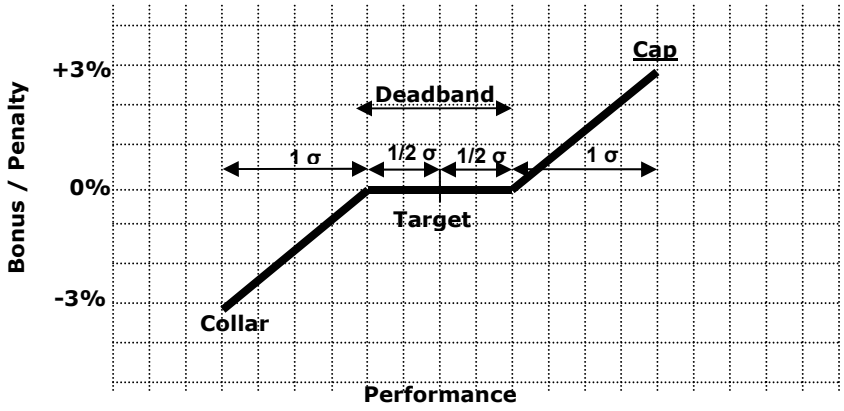


Figure 8.4 : Plus and minus one-half (±1/2) Standard Deviation

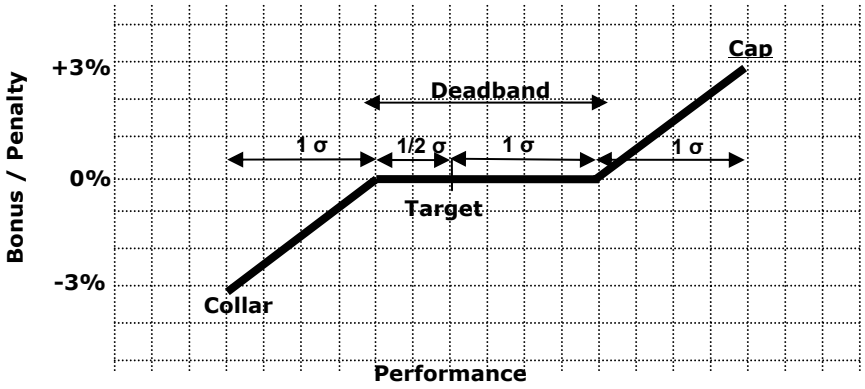


Figure 8.5 : Plus one (+1) and minus one-half (-1/2) Standard Deviation

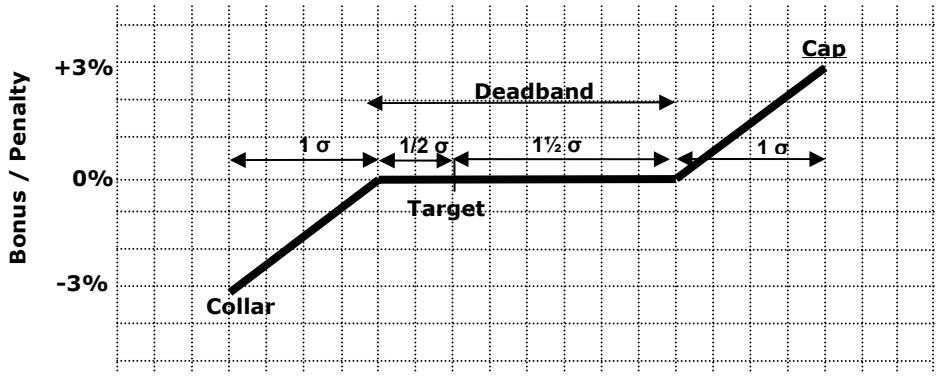


Figure 8.6 : Plus one and one-half (+1½) and minus one-half (-1/2) Standard Deviation

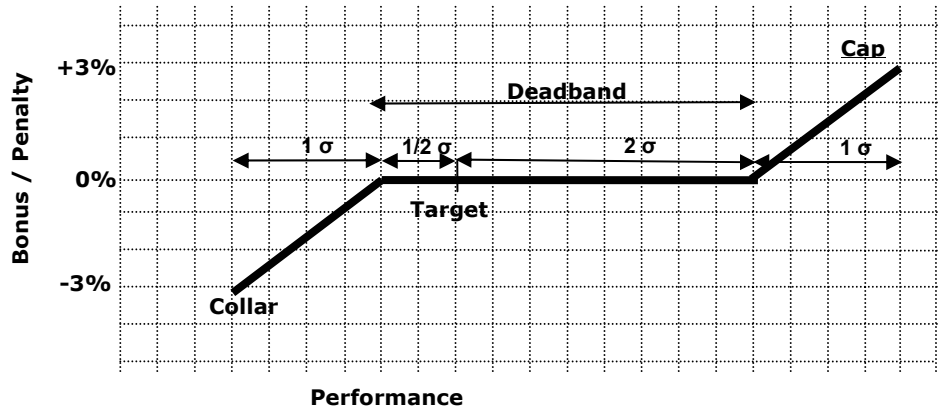


Figure 8.7 : Plus two (+2) and minus one-half (-1/2) Standard Deviation

8.7 Performance Indices Weighting:

8.7.1 The respective weightings of the performance indices may also be set in a way that it will encourage improvement on the indices that are not performing well. Where performance is currently reasonable, the reward and penalty % (of the total 100% being a maximum of ±3% of ARRt), should have a smaller % weighting than those performance measures which are currently not tracking particularly well. This should increase the incentive for TRANSCO to improve those measures which are not performing well.

8.8 ERC's Approach

8.8.1 The following are the ERC's position on the initial PIS.

On the Performance Measures:

8.8.2 ERC accept that the discussion above provides valid reasons for eliminating NIE, ASIFI, MAIFI, ASIDI and system loss from the PI used in the PIS. The five (5) indices for PIS proposed by TRANSCO could be adopted because it can already measure the quality and reliability of the supply of electric power. The proposed PI for the PIS are summarized below:

1. System Interruption Severity Index (SISI);
2. Frequency of Trippings per 100ckt-km (FOT/100ckt-km);
3. System Availability (SA);
4. Frequency Limit Compliance (FLC);
5. Voltage Limit Compliance (VLC);

8.8.3 Initially, the ERC suggested in its Issues Paper eight (8) PI measures for possible inclusion in a PIS. In its application TRANSCO / PSALM has suggested the following reasons why this number can be reduced.

8.8.4 The ASIFI, MAIFI and ASIDI were suggested to be excluded in the list of PIS because these indices were intended for distribution system, substations, circuits and defined regions. This was based on IEEE Std. 1366-2001 "IEEE Guide for Electric Power Distribution Reliability Indices".

8.8.5 Likewise, overseas regulatory thinking from Australian Competition and Consumer Commission (ACCC) paper on an Australian transmission company, stated that ASIFI and ASIDI are not recommended performance measures because these indices are deemed statistically unsound.

8.8.6 System Loss were suggested to be excluded from the list of PIS since technical losses which constitute the bulk of system loss is heavily dependent on the location of generation plants supplying power to the load centers, which is already beyond the control of TRANSCO. The nearer the generating plants that are supplying load to the load center, the lower will be the system losses. Likewise, it was found out that system loss is not included in the list of performance indicators established and used regularly by TRANSCO.

8.8.7 The ERC also notes that the system losses are factored into the rate setting process in a manner which already provides an incentive to reduce the non-technical and administrative losses experienced during the billing and collection process. This incentive for performance improvement is provided by the loss caps imposed on the billing process defined by the OATS rules.

8.8.8 The ERC believes that additional reliability measures as proposed in the Issues Paper are not necessary to be included in the PIS above those suggested by TRANSCO / PSALM, as the three measures in the application should be sufficient to reward or penalize reliability performance.

8.8.9 The ERC notes that TRANSCO will still have to report on a broader set of quality and reliability measures as defined in the Grid Code, and hence monitoring of broader quality and reliability performance will still be possible for the ERC.

8.8.10 However, the ERC recognizes that a single country-wide measure of the PI would clearly hide the differences in grid performance which are indicated by the historical data. In particular the country wide SISI measure for 2004 at 82.11. The grid numbers are for Luzon is 11.28, for Visayas is 591.04 and for Mindanao is 36.01. It is clear that the Philippines wide number hides the very poor performance in the Visayas. Also that the value of 82.11 is not the "outlier" against a normal SISI PI performance, but rather the value of 591.04 is an exact measure of "very poor performance". The ERC also recognizes that the solution to this low performance may also be outside the immediate control of TRANSCO.

8.8.11 Thus ERC suggests the PI and the resulting PIS should be measured separately by each grid (i.e. Luzon, Visayas and Mindanao) to get a better picture on the totality of TRANSCO's technical performance, and to reward / penalize performance changes relative to the current historical outcomes.

8.8.12 Exclusion of Sub-transmission Network's Performance Measures in the PIS:

(a) The performance indices are for the transmission network. The sub-transmission network will either be disposed or will form part of the connection assets for the Second Regulatory Period and on this basis, the ERC suggests these should be excluded in the computation of PIS.

(b) Nonetheless, to the extent TRANSCO continues to own and operate sub-transmission services, it should continue to monitor and report on the performance of these assets as required by the Grid Code.

On the Targets:

8.8.13 The "target" for each performance measure shall be whichever is better between the mean (i.e. from 2000 to 2004 actual performance) and the last year's measure of the PI as summarized in the following table.

PI	Mean (2000-2004)	2004 Actual Measure	Approach to Target	Target
Luzon				
SISI	17.08	11.28	Lowest	11.28
FOT	7.58	5.00	Lowest	5.00
SA	99.19	99.17	Highest	99.19
FLC	99.95	99.96	Highest	99.96
VLC	81.06	90.77	n/a[23]	81.06
Visayas				
SISI	272.80	591.04	Lowest	272.80
FOT	7.00	4.94	n/a[5]	7.00
SA	99.05	99.10	Highest	99.10
FLC	98.73	97.44	Highest	98.73
VLC	99.55	97.73	Highest	99.55
Mindanao				
SISI	61.59	36.01	n/a[5]	61.59
FOT	9.56	8.13	n/a[5]	9.56
SA	99.08	98.88	Highest	99.08
FLC	99.84	99.74	Highest	99.84
VLC	98.42	99.58	n/a[5]	98.42

Table 8.5 : Target for Deadband for Proposed PI

8.8.14 This approach provides the strongest incentive to improve performance than the use of the mean targets as proposed by TRANSCO / PSALM.

On the Deadbands:

8.8.15 An analysis has been conducted by the ERC on the five options mentioned in Section 8.4.3. that will provide the strongest motivation for TRANSCO to improve its performance.

8.8.16 The Plus Two (+2) and Minus One-half (-1/2) Standard Deviation, seemed to be the strongest driver among the five options. However, the said analysis revealed that most of the performance indicators will exceed their respective maximum measure (i.e. 0 minute or 100%) if the plus two (+2) Standard Deviation will be used from the Target to the Deadband High-Limit except for the SA for Luzon and Visayas which are well within the range without exceeding the maximum measure of 100%.

[23] Choose a target that will avoid cap falling beyond the maximum measure

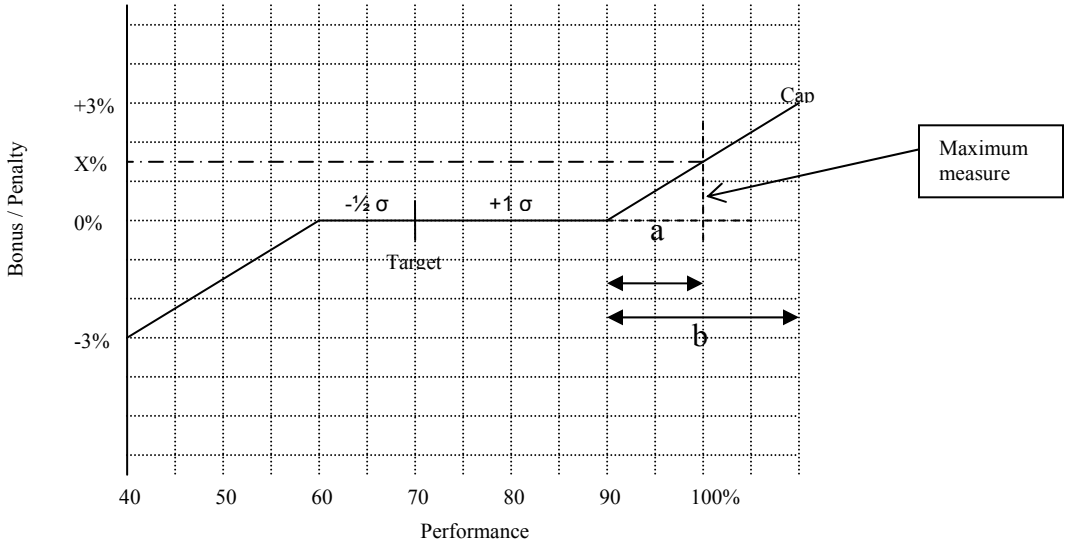
8.8.17 In the simulation using the different standard deviation of +2, +1½, +1 and +1/2 from the target or mean to the high limit value, most of the five PIs on each grid can use either of the four STDEVs without exceeding the possible maximum value. However, there are four PIs within the three (3) grids (see highlighted rows in Table 8.7 below) that all the time exceeds the possible maximum measure regardless of what standard deviation will be used.

8.8.18 In determining the appropriate standard deviation for each performance measure, the following approach was followed:

1. In each of the Performance Indices per Grid, choose the highest standard deviation that is deemed applicable without the cap value exceeding the maximum measure.

2. If the above-mentioned condition is not met for a particular PI, select a cap value among the options that is deemed nearest to the maximum value. However, it should be noted that the cap value shall be capped at the maximum measure (i.e. 0 min. or 100%)

3. The maximum reward (x%) for a PI that has a cap value which exceeded the maximum value will be based on a ratio and proportion as shown below:



$$\frac{x\%}{a} = \frac{3\%}{b}$$

Figure 8.8 : Maximum Benefit Adjustment

4. However, if the Deadband High Limit Value has already exceeded the maximum measure it is therefore recommended that no reward shall be given to the applicant since it is already performing at a considerable high level of performance. Instead the applicant shall maintain that high level of performance so as not to incur any penalty. The profile graph of it is shown below.

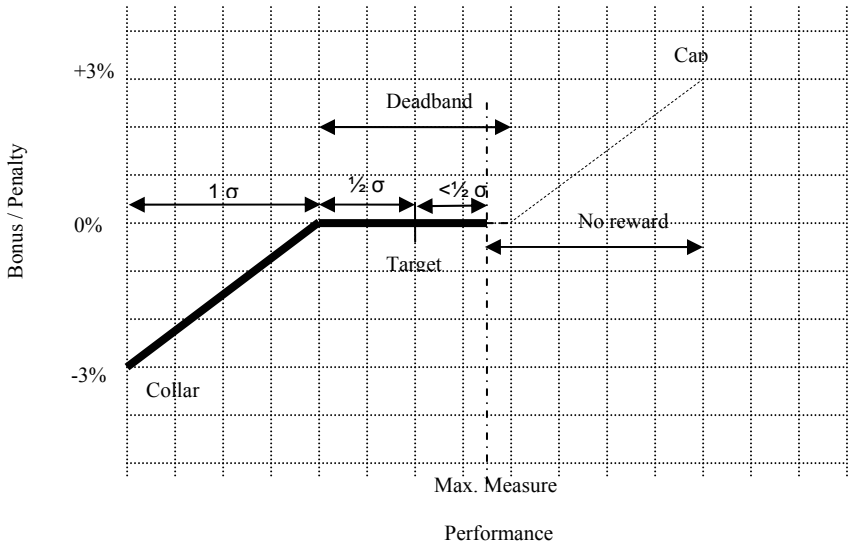


Figure 8.9 : Zero Benefit at High Limit

8.8.19 The Table 8.6 below summarizes the Standard Deviation of each Performance Measure for PIS.

PI	Collar (Penalty)	Deadband			Cap (Reward)	Max. Measure
		Low	Target	High		
	-3%	**0%**	**0%**	**0%**	**3%**	
Luzon						
SISI	1 STDEV	1/2 STDEV	Target	1 STDEV	1 STDEV	0 min.
FOT	1 STDEV	1/2 STDEV	Target	1½ STDEV	1 STDEV	0 min.
SA	1 STDEV	1/2 STDEV	Target	2 STDEV	1 STDEV	100%
FLC	1 STDEV	1/2 STDEV	Target	1/2 STDEV	**<1 STDEV**	100%
VLC	1 STDEV	1/2 STDEV	Mean	1/2 STDEV	1 STDEV	100%
Visayas						
SISI	1 STDEV	1/2 STDEV	Target	1/2 STDEV	**<1 STDEV**	0 min.
FOT	1 STDEV	1/2 STDEV	Mean	2 STDEV	1 STDEV	0 min.
SA	1 STDEV	1/2 STDEV	Target	2 STDEV	1 STDEV	100%
FLC	1 STDEV	1/2 STDEV	Target	1/2 STDEV	**<1 STDEV**	100%
VLC	1 STDEV	1/2 STDEV	Target	**<1/2 STDEV**	**no reward**	100%
Mindanao						
SISI	1 STDEV	1/2 STDEV	Mean	1/2 STDEV	1 STDEV	0 min.
FOT	1 STDEV	1/2 STDEV	Mean	1½ STDEV	1 STDEV	0 min.
SA	1 STDEV	1/2 STDEV	Target	1 STDEV	1 STDEV	100%
FLC	1 STDEV	1/2 STDEV	Target	1/2 STDEV	1 STDEV	100%
VLC	1 STDEV	1/2 STDEV	Mean	1/2 STDEV	1 STDEV	100%

Table 8.6 : Standard Deviation of each Performance Measure for PIS

8.8.20 The Table 8.7 below shows the result of the analysis on the different standard deviation that will be used for PIS.

PI	Collar (Penalty)	Deadband			Cap (Reward)	Max. Measure
		Low	Target	High		
	-3%	0%	0%	0%	3%	
Luzon						
SISI	18.441	13.667	11.280	6.506	1.732	0 min.
FOT	7.515	5.838	5.000	2.485	0.809	0 min.
SA	99.002	99.127	99.190	99.440	99.565	100%
FLC	99.893	99.941	99.965	99.988	100.00	100%
VLC	64.615	75.579	81.060	86.542	97.506	100%
Visayas						
SISI	553.756	366.453	272.802	179.151	0.00	0 min.
FOT	10.215	8.074	7.004	2.723	0.582	0 min.
SA	98.877	99.026	99.100	99.397	99.546	100%
FLC	96.865	98.110	98.732	99.354	100.00	100%
VLC	98.028	99.041	99.547	100.00	no reward	100%
Mindanao						
SISI	116.766	79.983	61.592	43.201	6.418	0 min.
FOT	14.711	11.273	9.554	4.397	0.959	0 min.
SA	98.450	98.869	99.078	99.496	99.915	100%
FLC	99.684	99.788	99.840	99.892	99.997	100%
VLC	96.936	97.926	98.421	98.915	99.905	100%

Table 8.7 : Bandwidth for the PIS

On the Weightings:

8.8.21 Reward / penalty should encourage improvement in a grid that has not been performing well with respect to each PI. The ERC recommends the following weightings be applied:

PI	Weightings		Weightings by Grid			
			Luzon	Visayas	Mindanao	Total
SISI	45%		20%	50%	30%	100%
FOT	25%		32%	29%	39%	100%
SA	10%		34%	33%	33%	100%
FLC	10%		34%	33%	33%	100%
VLC	10%		29%	36%	35%	100%
Total	100%					

Table 8.8 : PIS Weightings by PI and Grid

8.8.22 The weightings by PI are based on encouraging better performance from those measures which are considered to be most highly valued by customers. Also recognizing that PI with a smaller standard deviation can over- reward or over-penalize TRANSCO for small movements in the measure PI, lower weightings are proposed to be assigned to SA, FLC and VLC which all have a small (or narrow) deadband. In addition, ERC feels that the SISI is more important as a measure of customer importance than FOT, as SISI represents long-duration unserved energy which can adversely affect customers.

8.8.23 The weightings by grid were based on Transco's proportional average performance from 2000 to 2004 (bad performance in all measures gives a higher proportion of the average PI to the grid with low performance). However, for SISI, the proportional average performance would provide the following weights:

- Luzon 5%;
- Visayas 77%; and
- Mindanao 18%.

8.8.24 ERC is concerned that if these weightings are imposed the incentive for TRANSCO will be to drive for additional inter-island interconnector capacity, whereas the solution might be for the installation of additional generation capacity in either Negros or Panay to alleviate the poor PI at a lower economic cost. As such the proposed proportional average as provided in Table 8 for SISI has been modified to provide more incentive to ensure SISI is maintained or improved in Luzon and Mindanao. At the same time recognizing Mindanao has a poorer performance than Luzon, and therefore a higher weighting.

8.8.25 The overall weightings applied to each PI within each grid to derive the PIS outcomes, are the multiple of the PI weighting and the grid weighting.

8.9 Adjustment Process:

8.9.1 The reward / penalty adjustment occur on an annual basis using data for twelve months ending September 30 (as for the rate adjustment data), at the rate adjustment process during the fourth quarter of the same year. Such reward / penalty to apply in the following year through an adjusted MAR.

8.9.2 The reward or penalty is an adjustment to the Maximum Allowable Revenue (MAR), following the rate adjustments process defined in Article 6 of the TWRG. The PIS adjustment is best done annually with the rate adjustment process. Such adjustment will add to or subtracted from new MAR to be applied in the following year (i.e. the performance against the PIS for 2006 will be collated and reported in the TRANSCO rate adjustment application filed on October 31, 2006, and the reward / penalty shall be adjusted into the MAR for the 2007).

8.9.3 This is the closest to an "immediate" annual adjustment as is allowed by the current rate adjustment processes provide by the TWRG, and should encourage more rapid response to the PI outcomes than if the adjustment were accumulated and applied at the end of the Second Regulatory Period as an adjustment to the MAR for the Third Regulatory Period. The ERC recognizes that the timing for the delivery of PIS data is tight for the October data preparation period each year, but the performance policy filed by TRANSCO indicates daily and weekly reporting on all of the PI suggested in the Grid Code (and Issues Paper). The ERC believes the PIS data could be finalized with the month of October for the twelve month period ending on September 30 each year.

APPENDIX A

CAPITAL EXPENDITURE FORECAST BREAKDOWN

The following tables are referred to in the body of the report and summarize the breakdown of the capital expenditure forecasts and the capital project summaries into various included and excluded groups for use in the Draft Determination.

Table A.1 : Capex as Connection Asset as Identified by TRANSCO

	Projects	Region	Subtotal Million US$ real	Subtotal Million PhP real	TOTAL Million PhP real
1	Aurora-Polanco(Dipolog) 138kV TL Proj (Turnkey)	Mindanao	12.59	477.54	1,139.29
2	Biñan-Sucat 230kV Line Upgrade	Luzon	4.73	232.26	481.94
3	Casecnan (Manablon) Hydro Asso. TL	Luzon	0.00	41.26	41.26
4	Cebu III Transmission	Visayas	0.00	212.07	212.07
5	Cebu-Mactan Interconnection Proj.(Turnkey)	Visayas	23.61	61.84	1,334.32
6	Dasmariñas-Rosario 230KV T/L Project	Luzon	4.15	206.79	425.30
7	Leyte-Bohol Int.Proj.(Stage2)	Visayas	0.00	65.85	65.85
8	Luzon Cluster C S/S Exp. Project	Luzon	0.00	32.36	32.36
9	LUZON SUBSTATION EXPANSION - 2	Luzon	0.00	0.42	0.42
10	LUZON SUBTRANSMISSION EQUIPMENT UPGRADE	Luzon	0.00	0.68	0.68
11	LUZON SUB-TRANSMISSION LINE/EQUIPMENT REPLACEMENT	Luzon	0.00	1.22	1.22
12	Luzon(North) Subtransmission Project-1&2	Luzon	0.00	1.70	1.70
13	LUZON-MINDORO INTERCONNECTION PROJECT	Luzon	0.00	1.58	1.58
14	MEXICO-BALINTAWAK RECONDUCTORING	Luzon	0.00	1.40	1.40
15	Mindanao S/S Expansion - 2005	Mindanao	12.09	59.92	706.01
16	Mindanao S/S Expansion Project	Mindanao	0.00	23.12	23.12
17	Mindanao Subtransmission Projects-I	Mindanao	0.00	11.03	11.03
18	Natural Gas Ilijan Asso T/L	Luzon	0.00	4.98	4.98
19	Negros III Transmission	Visayas	0.13	15.72	22.83
20	Negros IV 138kV Transmission Project	Visayas	0.00	8.00	8.00
21	New Gamu 230 KV SS Project	Luzon	1.07	98.74	155.12
22	Northern Panay Backbone Project	Visayas	15.47	433.12	1,249.66
23	Pagbilao Coal T/L	Luzon	0.00	119.06	119.06

24	Panay-Boracay Interconnection Project	Visayas	0.00	146.96	146.96
25	Power Circuit Breaker Replacement Program - Mindanao	Mindanao	8.59	101.89	556.94
26	Power Circuit Breaker Replacement Project - Visayas	Visayas	5.79	68.72	376.04
27	San Francisco 138kV S/S Project (New)	Mindanao	0.00	96.72	96.72
28	SAN JOSE-BALINTAWAK T/L UPGRADE	Luzon	0.00	0.46	0.46
29	San Roque Asso. T/L & S/S	Luzon	1.86	41.44	141.65
30	Southern Panay Backbone T/L Project	Visayas	0.00	55.93	55.93
31	Sucat-Sta Mesa-Balintawak	Luzon	0.00	19.53	19.53
32	T/L & S/S Proj- Package 1 & 2	Luzon	4.66	19.07	272.21
33	Tap Hermosa-Balintawak	Luzon	0.37	14.42	34.09
34	Visayas Capacitor Project 1	Visayas	2.71	26.50	169.41
35	WB TGRL - Luzon S/S Reinf Project	Luzon	0.29	11.38	27.13
36	Wright-Calbayog 138kV T/L Proj.(Turnkey)	Visayas	8.60	330.50	785.07
37	Zamboanga City Area 138kV T/L Project	Mindanao	14.08	445.08	1,192.90
	TOTAL		**120.79**	**3489.26**	**9,914.24**

Table A.2 : Capital Projects Classified as Network Asset by ERC

	Project Name	Region	Rank	Total Million PhP real
1	Abaga-Kirahon 230kV TL Project	Mindanao	On-going	2,708.32
2	Batangas Trans. Reinf. Project	Luzon	On-going	1,267.21
3	Bauang-San Esteban L2 Stringing Project	Luzon	On-going	173.39
4	Biñan-Dasmariñas T/L Upgrading	Luzon	Completed	150.35
5	Binga-San Manuel 230kV TL Proj.	Luzon	1st Priority	1,481.57
6	Calaca II Asso. T/L	Luzon	Completed	3.46
7	Cebu-Negros Interconnection Uprating (Turnkey)	Visayas	On-going	2,818.26
8	Kirahon-Pulangui 230KV Transmission Backbone (Stage 2)	Mindanao	1st Priority	1,648.43
9	Lahar-Affected T/L Relocation Project	Luzon	Completed	8.56
10	Leyte-Bohol Int.Proj.(Stage2)	Visayas	Completed	65.85
11	Leyte-Cebu Exp/Uprating Proj.	Visayas	On-going	3,115.51
12	Leyte-Cebu HVAC Interc. Project-Stage1	Visayas	Completed	11.80

13	Leyte-Luzon HVAC Interc. Project	Visayas	Completed	11.60
14	Leyte-Samar Reinf. 69/138kV Project	Visayas	Completed	156.22
15	Luzon Cluster C S/S Exp. Project	Luzon	Completed	32.36
16	LUZON PCB REPLACEMENT PROJECT	Luzon	2nd Priority	53.01
17	LUZON-MINDORO INTERCONNECTION PROJECT	Luzon	2nd Priority	1.58
18	MEXICO-BALINTAWAK RECONDUCTORING	Luzon	2nd Priority	1.40
19	Mindanao Mobile Transformer Project	Mindanao	2nd Priority	238.33
20	Mindanao Reliability Compliance (N-1) Project 1	Mindanao	2nd Priority	0.00
21	Naga-Tayabas T/L Rehab Project	Luzon	2nd Priority	16.68
22	Negros III Transmission	Visayas	On-going	22.83
23	Negros IV 138kV Transmission Project	Visayas	2nd Priority	8.00
24	Negros V Transmission Project	Visayas	On-going	130.66
25	Negros-Panay Interconnection Uprating (Turnkey)	Visayas	On-going	2,602.93
26	Northern Panay Backbone Project	Visayas	1st Priority	1,249.66
27	Northwestern EHV	Luzon	Completed	43.89
28	Pagbilao Coal T/L	Luzon	Completed	119.06
29	Panay IV Transmission	Visayas	On-going	69.95
30	Panay-Boracay Interconnection Project	Visayas	On-going	146.96
31	Power Circuit Breaker Replacement Program - Mindanao	Mindanao	2nd Priority	556.94
32	Power Circuit Breaker Replacement Project - Visayas	Visayas	2nd Priority	376.04
33	Pulangui-Bunawan 230kV T/L Proj.(Turnkey) (Stage 1)	Mindanao	1st Priority	2,165.02
34	Reliability Compliance Project I - Mindanao	Mindanao	2nd Priority	108.46
35	San Francisco 138kV S/S Project (New)	Mindanao	1st Priority	96.72
36	SAN JOSE 500 KV RECONFIGURATION	Luzon	2nd Priority	1.40
37	SAN JOSE-BALINTAWAK T/L UPGRADE	Luzon	2nd Priority	0.46
38	Southern Panay Backbone T/L Project	Visayas	2nd Priority	55.93
39	Sucat-Sta Mesa-Balintawak	Luzon	Completed	19.53
40	Tacurong-Nuling 138 kV Transmission Line Project	Mindanao	2nd Priority	46.16
41	Visayas Capacitor Project 1	Visayas	On-going	169.41
42	Voltage Improvement Project - 1	Luzon	1st Priority	492.64
43	VOLTAGE IMPROVEMENT PROJECT-2	Luzon	Priority 2	19.45
44	Wright-Calbayog 138kV T/L Proj.(Turnkey)	Visayas	On-going	785.07
45	Zamboanga City Area 138kV T/L Project	Mindanao	On-going	1,192.90

TOTAL	24,443.96

Table A.3 : Capital Projects Classified as Connection Asset by ERC

	Project Name	Region	Rank	Total Million PhP real
1	Aurora-Polanco(Dipolog) 138kV TL Proj (Turnkey)	Mindanao	1st Priority	1,139.29
2	Biñan-Sucat 230kV Line Upgrade	Luzon	1st Priority	481.94
3	Casecnan (Manablon) Hydro Asso. TL	Luzon	Completed	41.26
4	Cebu III Transmission	Visayas	On-going	212.07
5	Cebu-Mactan Interconnection Proj.(Turnkey)	Visayas	On-going	1,334.32
6	Dasmariñas-Rosario 230KV T/L Project	Luzon	1st Priority	425.30
7	Luzon S/S Expansion Proj-1	Luzon	1st Priority	1,793.56
8	LUZON SUBSTATION EXPANSION - 2	Luzon	2nd Priority	0.42
9	LUZON SUBSTATION EXPANSION PROJECTS - 3	Luzon	2nd Priority	0.00
10	LUZON SUBTRANSMISSION EQUIPMENT UPGRADE	Luzon	2nd Priority	0.68
11	LUZON SUB-TRANSMISSION LINE/EQUIPMENT REPLACEMENT	Luzon	2nd Priority	1.22
12	Luzon(North) Subtransmission Project-1&2	Luzon	Completed	1.70
13	Mindanao S/S Expansion - 2005	Mindanao	On-going	706.01
14	Mindanao S/S Expansion Project	Mindanao	On-going	23.12
15	Mindanao Subtransmission Projects-I	Mindanao	On-going	11.03
16	Natural Gas Ilijan Asso T/L	Luzon	Completed	4.98
17	New Gamu 230 KV SS Project	Luzon	1st Priority	155.12
18	New Naga S/S Project	Visayas	2nd Priority	318.29
19	San Roque Asso. T/L & S/S	Luzon	On-going	141.65
20	T/L & S/S Proj- Package 1 & 2	Luzon	On-going	272.21
21	Tap Hermosa-Balintawak	Luzon	1st Priority	34.09
22	WB TGRL - Luzon S/S Reinf Project	Luzon	On-going	27.13
	TOTAL			**7,125.39**

Table A.4 : Capital Projects Classified as Partly Connection Asset / Partly Network Asset by ERC

	Project Name	Reg	Rank	Subtotal Mil US$ real	Subtotal Mil PhP real	Total Mil PhP real	% Network	% Coxn	Total Network	Total Coxn
1	Bohol Backbone Project	Vis	2nd Priority	0.00	110.98	110.98	66%	34%	73.24	37.73
2	Bunawan S/S	Min	On-going	0.00	43.81	43.81	88%	12%	38.55	5.26
3	Gen.Santos-Tacurong-Nuling Trans.Reinf.Proj.	Min	On-going	636.04	332.93	1,002.89	40%	60%	387.59	581.39
4	Luzon Transmission Equipment Upgrade	Luz	1st Priority	810.07	178.16	1,040.75	5%	95%	49.41	938.81
5	Luzon(North) T/L Upgrading Projects-1	Luz	1st Priority	2,121.84	1,285.93	3,516.98	90%	10%	3066.99	340.78
6	Maco Substation	Min	On-going	0.00	104.12	104.12	8%	92%	8.33	95.79
	TOTAL			**3,567.95**	**2,055.93**	**5,819.53**			**3624.12**	**1999.75**

Table A 5 : Total CAPITAL EXPENDITURE Sought by TRANSCO / PSALM Application (PhPm)

			Total CAPITAL EXPENDITURE for TRANSCO - Expressed in nominal equivalent Million Pesos							
			Actual (peso equivalent, nominal)		Budget (peso equivalent, nominal)	Forecast (peso equivalent, nominal)				
Asset Category			**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
(a)	**Transmission Lines**									
	1	Buildings, civil works and establishment	-	33.5	55.9	166.7	863.9	219.2	9.5	37.7
	2	Towers and associated lines	560.5	705.7	412.5	3,266.8	5,304.3	2,843.1	1,699.4	419.7
	3	Poles and associated lines	55.2	67.7	184.4	628.3	627.2	552.3	123.8	42.8
	4	Underground cables	-	29.0	1,818.4	1,338.6	300.7	101.5	0.1	0.1
	5	Submarine cables	692.8	684.5	0.1	215.9	1,216.5	469.1	-	-
	6	Easements owned by the Regulated	158.3	405.7	-	0.3	-	-	-	-
	7	Other	1.2	7.3	402.8	487.2	684.4	364.9	118.6	94.4
	8	Spares	158.4	260.3	107.4	75.4	120.3	102.0	68.2	71.1
	9	Land used for transmission lines	224.2	114.3	392.7	581.5	564.3	551.3	307.1	230.6
	Tot	**Sub-total Transmission Lines**	**1,850.6**	**2,307.9**	**3,374.1**	**6,760.6**	**9,681.5**	**5,203.4**	**2,326.7**	**896.4**
(b)	**Substation Components**									
	1	Buildings, civil works and establishment	5.3	0.5	339.4	400.1	723.8	188.2	56.5	70.7
	2	Transformers (power)	488.2	896.1	292.7	703.3	934.3	932.3	871.8	1,393.
	3	Circuit breakers	443.6	814.2	226.7	1,290.7	1,021.4	909.5	525.4	409.3
	4	Instrument transformers	112.8	207.0	40.9	138.8	235.5	221.0	267.5	326.3
	5	Meters and protection	93.3	171.3	145.9	226.0	296.7	92.7	66.1	71.5
	6	Capacitors and reactors	130.5	239.6	89.8	50.2	582.0	520.7	25.3	33.0
	7	Buswork	29.4	53.9	34.6	40.5	101.6	31.7	47.5	36.3
	8	Other	-	-	142.2	473.5	743.7	532.9	459.6	668.5
	9	Spares	113.2	384.6	214.4	138.4	162.0	179.1	161.1	290.4
	10	Land used for substations	15.3	15.1	31.9	101.5	108.9	40.8	8.7	7.2
	Tot	**Sub-total Substation Components**	**1,431.7**	**2,782.3**	**1,558.5**	**3,563.1**	**4,910.0**	**3,648.8**	**2,489.6**	**3,306.**
(c)	**Communication Plant**									
	1	Buildings, civil works and establishment	1.8	12.7	-	-	2.9	-	-	-
	2	Communications plant and infrastructure	568.6	75.2	8.1	70.6	657.7	209.7	0.1	6.7
	3	Ancillary infrastructure	13.3	11.3	2.7	1.1	26.2	9.1	0.2	0.2
	4	Other	-	6.6	0.6	29.4	75.0	8.8	-	6.6
	5	Spares	-	-	-	1.0	14.9	9.0	0.2	0.1
	6	Land used for communications plant	-	-	0.2	0.2	0.2	0.1	-	-
	Tot	**Sub-total UG Transmission Lines**	**583.7**	**105.7**	**11.5**	**102.3**	**776.9**	**236.7**	**0.4**	**13.5**
(d)	**System Operations**									
	1	Buildings, civil works and establishment	8.8	15.5	26.6	10.3	3.3	0.9	0.8	1.4
	2	Control room and control infrastructure	31.7	5.5	2.4	1.9	3.1	3.6	1.6	2.1
	3	Ancillary infrastructure	195.3	328.7	362.3	234.1	227.5	171.7	46.3	40.3
	4	Other	28.5	131.6	45.0	23.0	96.8	73.8	9.8	7.9
	5	Land used for system operations	-	-	-	0.5	2.0	1.9	1.8	2.4
	Tot	**Sub-total Substation Components**	**264.3**	**481.3**	**436.3**	**269.8**	**332.8**	**251.9**	**60.4**	**54.1**
(e)	**Non-network Assets**									
	1	Computers, and office equipment	179.6	651.7	44.0	41.8	52.1	43.0	25.7	21.7
	2	Plant, tools, and equipment	64.6	181.2	163.4	212.8	282.3	190.6	41.2	44.1
	3	Furniture, fixtures, and fittings	-	-	21.8	21.6	30.7	20.4	12.3	14.6
	4	Commercial buildings	46.1	18.4	67.7	26.4	43.3	22.8	2.7	2.6
	5	Land (all remaining land)	0.0	-	15.1	18.7	7.5	6.6	7.2	5.3
	6	Other	106.4	437.9	81.1	36.1	49.8	38.5	19.8	9.5
	Tot	**Sub-total Non-Network Assets**	**396.66**	**1,289.30**	**393.2**	**357.33**	**465.65**	**321.92**	**108.88**	**97.84**
Allocated Overhead Capitalized			994.5	1,274.6	643.3	869.7	1,305.2	1,331.8	1,167.7	1,230.
Total Capital Expenditure			**5,521.4**	**8,241.2**	**6,416.9**	**11,922.9**	**17,471.**	**10,994.6**	**6,153.7**	**5,599.**
Exchange Rate Assumptions (PESA / US$)			56.0	56.0	56.0	58.3	60.0	61.0	61.7	62.4
USA CPI Assumption (%)			4.0%	4.0%	3.2%	2.9%	2.9%	2.8%	2.8%	2.8%
Philippines CPI Assumption (%)			8.2%	8.2%	8.2%	7.2%	5.8%	4.6%	3.9%	3.9%

Table A.6 : Total CAPITAL EXPENDITURE used by ERC for Draft Determination (PhPm)

			Total CAPITAL EXPENDITURE for TRANSCO - Expressed in nominal equivalent Million Pesos							
			Actual (peso equivalent, nominal)		Budget (peso equivalent, nominal)	Forecast (peso equivalent, nominal)				
Asset Category			**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
(a)	**Transmission Lines**									
	1	Buildings, civil works and	-	33.5	-	-	-	-	-	24.2
	2	Towers and associated lines	559.4	704.4	23.7	1,729.0	2,202.9	1,659.9	1,262.5	342.8
	3	Poles and associated lines	54.7	67.4	-	3.6	11.2	4.6	0.2	0.8
	4	Underground cables	-	29.0	-	-	-	-	-	-
	5	Submarine cables	676.8	674.0	-	-	-	-	-	-
	6	Easements owned by the Regulated	158.3	405.7	-	-	-	-	-	-
	7	Other	1.2	7.2	119.8	93.8	106.1	59.9	25.0	21.5
	8	Spares	158.4	260.3	-	-	-	-	-	-
	9	Land used for transmission lines	224.2	114.3	87.4	134.2	160.9	180.4	56.3	23.9
	Tot	**Sub-total Transmission Lines**	**1,833.1**	**2,295.8**	**231.0**	**1,960.6**	**2,481.2**	**1,904.9**	**1,344.0**	**413.0**
(b)	**Substation Components**									
	1	Buildings, civil works and	5.2	0.5	-	45.8	70.8	10.4	3.8	23.1
	2	Transformers (power)	481.0	887.7	-	64.9	270.1	548.2	259.6	34.2
	3	Circuit breakers	437.0	806.6	1.4	705.7	347.5	462.4	364.5	150.3
	4	Instrument transformers	111.1	205.0	-	26.0	102.9	155.8	180.1	165.4
	5	Meters and protection	92.0	169.7	0.2	10.9	46.2	25.9	40.2	28.7
	6	Capacitors and reactors	128.6	237.3	-	0.6	134.8	352.2	0.1	23.6
	7	Buswork	28.9	53.4	-	12.2	25.6	7.6	36.4	28.5
	8	Other	-	-	2.2	87.8	317.4	297.6	312.8	330.2
	9	Spares	113.2	384.6	-	9.5	50.3	75.6	41.5	30.5
	10	Land used for substations	15.3	15.1	5.9	20.6	15.4	2.9	0.2	0.2
	Tot	**Sub-total Substation Components**	**1,412.4**	**2,760.1**	**9.6**	**984.0**	**1,380.9**	**1,938.5**	**1,239.3**	**814.7**
(c)	**Communication Plant**									
	1	Buildings, civil works and	1.8	12.7	-	-	-	-	-	-
	2	Communications plant and	557.7	74.2	2.2	-	-	-	-	-
	3	Ancillary infrastructure	13.1	11.3	-	-	-	-	-	-
	4	Other	-	6.6	-	-	-	-	-	-
	5	Spares	-	-	-	-	-	-	-	-
	6	Land used for communications plant	-	-	-	-	-	-	-	-
	Tot	**Sub-total UG Transmission Lines**	**572.6**	**104.8**	**2.2**	**-**	**-**	**-**	**-**	**-**
(d)	**System Operations**									
	1	Buildings, civil works and	8.8	15.5	16.3	-	-	-	-	-
	2	Control room and control infrastructure	31.1	5.5	2.0	-	-	-	-	-
	3	Ancillary infrastructure	192.2	327.3	197.3	99.2	12.6	7.0	14.1	13.9
	4	Other	28.5	131.5	1.1	-	-	-	-	-
	5	Land used for system operations	-	-	-	-	-	-	-	-
	Tot	**Sub-total Substation Components**	**260.5**	**479.8**	**216.7**	**99.2**	**12.6**	**7.0**	**14.1**	**13.9**
(e)	**Non-network Assets**									
	1	Computers, and office equipment	179.6	645.0	0.5	-	0.1	-	-	-
	2	Plant, tools, and equipment	64.6	181.2	0.0	-	-	-	-	-
	3	Furniture, fixtures, and fittings	-	-	-	-	-	-	-	-
	4	Commercial buildings	46.1	18.4	4.4	-	-	-	-	-
	5	Land (all remaining land)	0.0	-	-	-	-	-	-	-
	6	Other	106.4	437.4	0.6	-	0.2	-	-	-
	Tot	**Sub-total Non-Network Assets**	**396.66**	**1,282.02**	**5.5**	**-**	**0.23**	**-**	**-**	**-**
Allocated Overhead Capitalized			994.5	1,274.6	24.8	29.9	24.2	17.7	2.1	-
Total Capital Expenditure			**5,469.7**	**8,197.0**	**489.9**	**3,073.7**	**3,899.1**	**3,868.0**	**2,599.5**	**1,241.6**
Exchange Rate Assumptions (PESA / US$)			54.7	54.7	54.7	53.5	52.8	52.5	52.8	53.3
USA CPI Assumption (%)			4.0%	4.0%	3.0%	2.5%	2.4%	2.3%	2.3%	2.3%
Philippines CPI Assumption (%)			4.7%	4.7%	4.7%	4.8%	4.8%	4.6%	4.4%	4.2%

APPENDIX B

WACC MARKET DATA

Electricity Company Descriptions – Source Bloomberg, November 4, 2005

Comparable Company Analysis - Electricity Transmission Company Descriptions

Ticker	Company Name	Country	Company Descriptions	Use
ISA	INTERCONEXION ELECTRICA SA	COLOMBIA	Interconexion Electrica S.A. transmits high voltage electricity within the national network in Colombia. The Company operates and supervises substations and electricity networks, and offers chemical analysis and maintenance services.	Y
REE	RED ELECTRICA DE ESPANA	SPAIN	Red Electrica de Espana maintains and operates Spain's electricity transmission network. The Company extends the high-voltage grid and coordinates the production and transmission systems. Red Electrica also operates a fiber optic network, and offers Internet connectivity and website hosting solutions to Internet service providers.	Y
TRAN	TRANSENER SA-B	ARGENTINA	Cia de Transporte de Energia Electrica de Alta Tension Transener S.A. owns the national extra high voltage electricity transmission network in Argentina, and transports high voltage electrical energy throughout the country.	Y
TRPL4	Companhia de Transmissao de Energia Eletrica Paulista	Brazil	Companhia de Transmissao de Energia Eletrica Paulista transmits electrical power to the Brazilian State of Sao Paulo. The Company transmits electricity that is generated by CESP -Companhia Energetica de Sao Paulo, Companhia de Geracao de Energia Eletrica Paranapanema, and Companhia de Geracao de Energia Eletrica	Y
BLX/A	Boralex Inc.	Canada	Boralex Inc. produces hydroelectric and thermal power. The company owns hydroelectric power stations in Quebec, Canada, a natural gas-fired cogeneration plant located in Kingsey Falls, Canada, and a wood waste cogeneration plant located in Dolbeau, Canada. Boralex also owns a hydroelectric power station in Palmer, Massachusetts and a wood waste cogeneration plant in Stratton, Maine.	Y

Comparable Company Analysis - Vertically Integrated Company Descriptions

Ticker	Company Name	Country	Company Descriptions	Use
KESC	Karachi Electric Supply Corporation	PA	Karachi Electric Supply Corporation Limited is a state-controlled power producer, which transmits and distributes electricity.	Y
CEPE5	Companhia Energetica de Pernambuco	Brazil	Companhia Energetica de Pernambuco - Celpe provides electric power to the Brazilian State of Pernambuco. Celpe generates, transmits, distributes, and markets electricity to residential, commercial, industrial, and rural consumers.	
CGE	Compania General de Electricidad S.A.	Chile	Compania General de Electricidad S.A. generates and distributes electricity to residential, commercial, and industrial customers in southern Chile. The Company also maintains electrical networks, and rents and markets electrical equipment.	
ELET6	Centrais Eletricas Brasileiras S.A. (Eletrobras)	Brazil	Centrais Eletricas Brasileiras S.A. (Eletrobras) generates, transmits, and markets electricity through regional companies in Brazil. The Company plans, finances, coordinates, and supervises expansion projects for its subsidiaries.	
ELECDA	Empresa Electrica de Antofagasta S.A. (Elecda)	Chile	Empresa Electrica de Antofagasta S.A. (Elecda) transmits and distributes electricity to residential, commercial, and industrial customers in Chile. The Company's concession area includes the cities of Antofagasta, Calama, Tocopilla, Taltal, and Mejillones. Elecda also designs and constructs lines and substations, and operates and maintains its own installations.	Y
LIGH3	Light Servicos de Eletricidade S.A.	Brazil	Light Servicos de Eletricidade S.A. generates, transmits and distributes electricity in the Brazilian State of Rio de Janeiro. The Company operates in the State of Rio de Janeiro.	Y
CGOS6	Cia. Energetica de Goias S.A	Brazil	Cia. Energetica de Goias S.A. - Celg generates, transmits, transforms, and distributes electricity to the Brazilian state of Goias. The Company operates five turbines and 5 generators, and sells to residential, commercial, and industrial customers.	
ELPL4	Eletropaulo Metropolitana S.A.	Brazil	Eletropaulo Metropolitana S.A. generates, transmits, distributes, and markets electrical power to the City of Sao Paulo and surrounding metropolitan regions.	Y
ENERSIS	Enersis S.A.	Chile	Enersis S.A. generates and transmits electricity in Chile, Argentina, Peru, Colombia, and Brazil. Through subsidiaries, the Company operates electricity generating plants and energy distribution systems, develops real estate, and provides data processing and computer maintenance services.	
ENER6	Empresa Energetica de Mato Grosso do Sul S.A	Brazil	Empresa Energetica de Mato Grosso do Sul S.A. - Enersul generates, transmits, and distributes electricity to 72 of the 77 municipalities of the Brazilian State of Mato Grosso do Sul.	
ESCE3	Espirito Santo Centrais Eletricas S.A.	Brazil	Espirito Santo Centrais Eletricas S.A. - Escelsa generates, transmits and distributes electricity to municipalities in the Brazilian State of Espirito Santo. The Company's major customers are industrial and residential consumers. Escelsa operates distribution centers, and offers maintenance and engineering	

TNB	TENAGA NASIONAL BHD	MALAYSIA	Tenaga Nasional Berhad transmits, distributes, and sells electricity under license issued by the Director General of Electricity Supply. Through its subsidiaries, the Company manufactures, sells and repairs transformers and switchgears. Tenaga Nasional also provides project management and consultancy, engineering works and energy project development services.	Y
2	CLP HLDGS LTD	Hong Kong	CLP Holding Limited, through its subsidiaries, generates and supplies electricity. The company also develops and invests in power porjects and invests in properties. From their website, CLP Power Hong Kong operates the power stations and transmits electricity to its 2.1 million customers via its solely owned 11,645 km transmission/distribution network that includes 11,861 substations.	
9502	Chubu Electric Power Company	Japan	Chubu Electric power company, incorporated generates, transmits, distributes, and seels electricity in Chubu area. The company's serice area includes Aichi, Gifu, Mie, Ngano, and part of Shizuoka Prefecture.	
9501	The Tokyo Electric power company	Japan	The Tokyo elctric power company, incorporated generates, transmits, and distributes electricity. The company uses hydroelectric, thermal, and nuclear power sources. Tokyo electric power distributes electricity in the Kanto area, which includes the Tokyo metro area, Kanagawa, Chiba, and Saitama prefectures.	
9505	Hokuriku Electric Power Company	Japan	Hokuriku electric power company generates, transmits, distributes and sells electricity in the Hokuriku area including Fukui, Ishikawa, and Toyama prefectures. The company uses hydroelectric and nuclear power sources.	
015760	KOREA ELECTRIC POWER CORP	South Korea	Korea Electric Power Corporation (KEPCO) generates, transmits, and distributes electricity to South Korea for a variety of uses. The Company also builds and operates hydro-power, thermal-power, and nuclear power units in South Korea. KEPCO is majority owned by the Korean government.	
SPC	SALCON POWER CORP	Philippines	Salcon Power Corporation, through its subsidiaries, participates in power generation and distribution. The Company also provides alternative power, and technical and rehabilitation services.	
FPL US Equity	FPL Group	United States	FPL Group, Inc. is a public utility holding company. The Company, through its subsidiary, generates, transmits, distributes, and sells electric energy. FPL's customers are located throughout the east and lower west coasts of Florida.	
FE US Equity	FirstEnergy Corp	United States	FirstEnergy Corp. is a public utility holding company headquartered in Akron, Ohio. FirstEnergy subsidiaries and affiliates are involved in the generation, transmission and distribution of electricity, exploration and production of oil and natural gas, transmission and marketing of natural gas, and energy management and other energy-related services.	
DUK US Equity	Duke Energy Corporation	United States	Duke Energy Corporation is a diversified multinational energy company with an integrated network of energy assets and expertise. The Company manages a portfolio of natural gas and electric supply, delivery, and trading businesses.	
TXU US Equity	TXU Corp	United States	TXU Corp. is a major energy company with operations in North America and Australia. The company is involved in electricity generation, wholesale and retail energy sales, portfolio management, and electric and natural gas transmission and distribution. TXU delivers or sells energy to customers in the United States and Australia.	
AVA US Equity	Avista Corporation	United States	Avista Corporation is an energy company that delivers products and solutions to business and residential customers throughout North America. The Company, through Avista Utilities, generates, transmits, and distributes electric and natural gas. Avista's other businesses include Avista Advantage and Avista Energy.	
BKH US Equity	Black Hills Corporation	United States	Black Hills Corporation, an energy and communications company, generates, purchases, transmits, distributes, and sells electric power and energy in western South Dakota, northeastern Wyoming, and southeastern Montana. The Company also explores for and produces oil and gas in the Rocky Mountain region, Texas, California, and various other locations.	
ALE US Equity	Allete Inc	United States	ALLETE, Inc. provides energy services in the upper Midwest United States. The Company generates, transmits, distributes, markets, and trades electrical power for retail and wholesale customers.	
AET IM Equity	AEM Torina S.p.A	Italy	AEM Torino S.p.A. generates, distributes, and sells electricity and district heating in Turin. The Company also manages the public lighting network, traffic lights, and thermal and electrical plants which are owned by the municipality, operates thermal and electrical plants for third parties, and offers energy planning and consulting services and Internet access services.	
CEN NZ Equity	Contact Energy Limited	New Zealand	Contact Energy Limited is a diversified and integrated energy company which focuses on the generation of electricity and the sale of electricity and gas in New Zealand.	
SSE LN Equity	Scottish and Southern Energy plc	Britain	Scottish and Southern Energy plc generates, transmits, distributes and supplies electricity to industrial, commercial and domestic customers in England, Wales and Scotland. The Group also provides electrical and utility contracting services, environmental control systems for the pharmaceutical and manufacturing sectors, and supplies natural gas.	
IPR LN Equity	International Power plc	Britain	International Power plc generates and sells electricity internationally. The Group has operating facilities in some 13 countries, including Australia, the Czech Republic, Malaysia, Pakistan, Portugal, Spain, Turkey, the United States	

Comparable Company Analysis - Gas Transmission Company Descriptions

Ticker	Company Name	Country	Company Descriptions	Use
APA AU Equity	APA AU Equity	Australia	Australian Pipeline Trust has interests in a portfolio of high-pressure gas transmission pipelines in Australia covering four states and two territories which transport natural gas. Some of the Trust's pipeline systems include the Moomba to Sydney and Roma to Brisbane.	N
GAS AU Equity	GAS AU Equity	Australia	GasNet Australia Group, through its subsidiary, owns and maintains gas transmission pipelines in Victoria and New South Wales. The Group also owns and operates a liquefied natural gas storage and vaporization facility, compressor stations and metering, odourant, injection, monitoring, control and communication systems.	N
SRG IM Equity	SRG IM Equity	Italy	Snam Rete Gas S.p.A. owns and operates Italy's natural-gas distribution network. The Company transports gas on behalf of importers, distributors, and companies supplying Italian households. Rete owns a network of high-and medium-pressure pipes, including trunklines connected to production and importation sites in Italy.	N
SSGC PA Equity	SSGC PA Equity	Pakistan	Sui Southern Gas Company Limited transmits and distributes natural gas, and constructs high pressure transmission and low pressure distribution systems. The Company's transmission system extends from Sui in Balcohistan to Karachi in Sindh, located in Pakistan.	N

APPENDIX C
PIS MEASUREMENT ANALYSIS

The following Tables and Annex summarise various of the PIS analysis.

TRANSCO ANNUAL TRANSMISSION PERFORMANCE INDICATORS (BASED ON SPM-IS DATABASE)

GRIDS	ACTUAL					TARGET* 2005		REMARK	
LUZON	**2000**	**2001**	**2002**	**2003**	**2004**	**LOWER**	**UPPER**	**MEAN**	**STDEV**
Number of Interuption Events (NIE)	142	134	97	75	65	137.04	68.16	102.60	34.44
System Average Interruption Duration Index (SAIDI), minutes	123.59	146.95	164.60	47.78	53.15	161.05	53.37	107.21	53.84
Sustained Average Interruption Frequency Index (SAIFI)	0.80	1.02	0.88	0.44	0.33	0.99	0.40	0.70	0.30
Momentary Average Interruption Frequency Index (MAIFI)	0.47	0.33	0.63	0.17	0.67	0.66	0.25	0.45	0.21
System Interruption Severity Index (SISI), minutes	18.69	18.30	23.52	13.62	11.28	21.85	12.31	17.08	4.77
Frequency of Tripping Events Per 100CKm (FOT/100CKm)	9.01	9.09	8.32	7.99	5.00	9.56	6.20	7.88	1.68
Average Outage Duration (AOD), Minutes/ Trip	380.14	369.01	364.37	396.88	441.48	421.57	359.18	390.38	31.19
VISAYAS	**2000**	**2001**	**2002**	**2003**	**2004**				
Number of Interuption Events (NIE)	167	180	118	154	118	175.77	119.03	147.40	28.37
System Average Interruption Duration Index (SAIDI), minutes	342.08	390.27	207.88	240.22	341.26	381.13	227.55	304.34	76.79
Sustained Average Interruption Frequency Index (SAIFI)	2.02	2.60	1.94	1.22	2.16	2.49	1.49	1.99	0.50
Momentary Average Interruption Frequency Index (MAIFI)	1.92	1.57	0.72	0.97	1.14	1.74	0.78	1.26	0.48
System Interruption Severity Index (SISI), minutes	242.06	163.69	111.87	255.35	591.04	460.11	85.50	272.80	187.30
Frequency of Tripping Events Per 100CKm (FOT/100CKm)	9.44	8.58	7.40	4.66	4.94	9.14	4.87	7.00	2.14
Average Outage Duration (AOD), Minutes/ Trip	159.97	150.03	193.53	201.99	123.90	197.97	133.80	165.88	32.08
MINDANAO	**2000**	**2001**	**2002**	**2003**	**2004**				
Number of Interuption Events (NIE)	87	43	39	43	24	70.78	23.62	47.20	23.58
System Average Interruption Duration Index (SAIDI), minutes	148.34	24.83	659.39	53.44	46.04	455.04	-82.23	186.41	268.63
Sustained Average Interruption Frequency Index (SAIFI)	2.83	0.60	0.73	1.01	0.76	2.11	0.25	1.18	0.93
Momentary Average Interruption Frequency Index (MAIFI)	0.38	0.43	0.17	0.26	0.15	0.41	0.15	0.28	0.13
System Interruption Severity Index (SISI), minutes	122.78	29.89	59.02	60.26	36.01	98.37	24.81	61.59	36.78
Frequency of Tripping Events Per 100CKm (FOT/100CKm)	15.32	9.88	7.93	6.51	8.13	13.00	6.12	9.56	3.44
Average Outage Duration (AOD), Minutes/ Trip	517.97	263.43	147.87	140.98	160.49	406.02	86.27	246.15	159.88
PHILIPPINES	**2000**	**2001**	**2002**	**2003**	**2004**				
Number of Interuption Events (NIE)	396	357	254	272	207	374.62	219.78	297.20	77.42
System Average Interruption Duration Index (SAIDI), minutes	176.34	158.02	337.09	90.56	180.16	279.01	97.85	188.43	90.58
Sustained Average Interruption Frequency Index (SAIFI)	1.73	1.22	1.06	0.79	0.83	1.50	0.74	1.12	0.38
Momentary Average Interruption Frequency Index (MAIFI)	0.74	0.63	0.50	0.37	0.60	0.70	0.43	0.57	0.14
System Interruption Severity Index (SISI), minutes	56.64	38.19	38.24	48.71	82.11	70.91	34.64	52.78	18.14
Frequency of Tripping Events Per 100CKm (FOT/100CKm)	10.75	9.20	8.05	6.99	5.77	10.08	6.22	8.15	1.93
Average Outage Duration (AOD), Minutes/ Trip	397.68	303.04	280.53	312.03	291.52	363.62	270.30	316.96	46.66

NOTE: * Based on the requirements of the Regulatory Reset Issues Paper (Sec. 7.2.1) Exemptions are OO01 (Force Majeure), OO02 (MLD due to Plant Outage), OO04 (UFR due to Plant Outage), OO08 (Switching/ Normalization of Load), OO09 (System Blackout), OO12 (War, Rebellion or Criminal Act), OO14 (Planned Required by Project/Other Group), OO16 (Customer Owned/Maintained Line), MO00 (Maintenance Outages) and PO00 (Planned Outages). Rationale to the discrepancy in the previous report submitted: The System Performance Monitoring - Information System (SPM-IS) database program was still under development and unavailability of Visayas data for CY 1998 to 1999; Revalidation and verification of data from all districts; Modification in the analysis of the computation of the above indices; Additional outage exemptions (e.g. Planned & Maintenance outages) in compliance to the Phil. Grid Code Chapter 3 Sec. 3.

Table C.1 : Summary of the Transmission Network Performance

TRANSCO ANNUAL SUBTRANSMISSION PERFORMANCE INDICATORS (BASED ON SPM-IS DATABASE)

GRIDS	ACTUAL					TARGET* 2005		REMARK	
LUZON	**2000**	**2001**	**2002**	**2003**	**2004**	**LOWER**	**UPPER**	**MEAN**	**STDEV**
Number of Interuption Events (NIE)	1,951	1,802	1,552	1,514	791	1,968.59	1,075.41	1,522.00	446.59
System Average Interruption Duration Index (SAIDI), minutes	1,325.93	854.85	911.71	836.11	317.99	1,207.63	491.00	849.31	358.32
Sustained Average Interruption Frequency Index (SAIFI)	5.14	4.14	4.50	4.19	2.21	5.13	2.94	4.04	1.09
Momentary Average Interruption Frequency Index (MAIFI)	8.69	9.35	7.47	6.45	3.65	9.36	4.88	7.12	2.24
System Interruption Severity Index (SISI), minutes	147.89	161.83	136.22	118.29	65.23	163.38	88.41	125.89	37.48
VISAYAS	**2000**	**2001**	**2002**	**2003**	**2004**				
Number of Interuption Events (NIE)	622	430	512	549	384	593.98	404.82	499.40	94.58
System Average Interruption Duration Index (SAIDI), minutes	1,613.37	1,295.81	2,007.80	1,383.28	857.03	1,854.53	1,008.39	1,431.46	423.07
Sustained Average Interruption Frequency Index (SAIFI)	6.06	5.44	7.09	5.76	3.55	6.87	4.29	5.58	1.29
Momentary Average Interruption Frequency Index (MAIFI)	6.40	6.03	5.48	5.47	4.72	6.26	4.98	5.62	0.64
System Interruption Severity Index (SISI), minutes	613.65	608.57	693.58	807.97	329.73	787.30	434.10	610.70	176.60
MINDANAO	**2000**	**2001**	**2002**	**2003**	**2004**				
Number of Interuption Events (NIE)	590	722	667	613	681	707.74	601.46	654.60	53.14
System Average Interruption Duration Index (SAIDI), minutes	697.27	688.24	815.38	912.09	399.39	895.33	509.62	702.48	192.86
Sustained Average Interruption Frequency Index (SAIFI)	3.50	3.42	4.53	3.01	2.96	4.12	2.85	3.48	0.63
Momentary Average Interruption Frequency Index (MAIFI)	3.21	5.12	4.86	6.30	5.99	6.31	3.89	5.10	1.21
System Interruption Severity Index (SISI), minutes	681.68	1,326.21	637.95	306.54	321.78	1,068.35	241.31	654.83	413.52
PHILIPPINES	**2000**	**2001**	**2002**	**2003**	**2004**				
Number of Interuption Events (NIE)	3,163	2,954	2,731	2,676	1,856	3,173.46	2,178.54	2,676.00	497.46
System Average Interruption Duration Index (SAIDI), minutes	1,173.56	892.90	1,112.57	976.92	450.28	1,206.72	635.77	921.25	285.47
Sustained Average Interruption Frequency Index (SAIFI)	4.78	4.18	5.06	4.15	2.71	5.08	3.27	4.17	0.91
Momentary Average Interruption Frequency Index (MAIFI)	6.39	7.26	6.19	6.19	4.59	7.09	5.16	6.12	0.97
System Interruption Severity Index (SISI), minutes	270.92	373.96	265.42	228.66	133.31	341.08	167.83	254.46	86.62

NOTE: * Based on the requirements of the Regulatory Reset Issues Paper (Sec. 7.2.1) Exemptions are OO01 (Force Majeure), OO02 (MLD due to Plant Outage), OO04 (UFR due to Plant Outage), OO08 (Switching/ Normalization of Load), OO09 (System Blackout), OO12 (War, Rebellion or Criminal Act), OO14 (Planned Required by Project/Other Group), OO16 (Customer Owned/Maintained Line), MO00 (Maintenance Outages) and PO00 (Planned Outages). Rationale to the discrepancy in the previous report submitted: The System Performance Monitoring - Information System (SPM-IS) database program was still under development and unavailability of Visayas data for CY 1998 to 1999; Revalidation and verification of data from all districts; Modification in the analysis of the computation of the above indices; Additional outage exemptions (e.g. Planned & Maintenance outages) in compliance to the Phil. Grid Code Chapter 3 Sec. 3.

Table C.2 : Summary of the Sub-Transmission Network Performance

TRANSCO ANNUAL POWER QUALITY

GRIDS	ACTUAL					TARGET* 2005		REMARK	
LUZON	**2000**	**2001**	**2002**	**2003**	**2004**	**UPPER**	**LOWER**	**MEAN**	**STDEV**
FLC	99.98636	99.98101	99.86911	99.94365	99.96453	99.99656	99.90131	99.94893	0.04763
VLC	67.90943	70.74715	85.42783	90.44265	90.77524	92.02393	70.09699	81.06046	10.96347
VISAYAS	**2000**	**2001**	**2002**	**2003**	**2004**				
FLC	99.58830	99.63790	99.69170	97.30190	97.43850	99.97597	97.48735	98.73166	1.24431
VLC	100.00000	100.00000	100.00000	100.00000	97.73540	100.55984	98.53432	99.54708	1.01276
MINDANAO	**2000**	**2001**	**2002**	**2003**	**2004**				
FLC	99.86740	99.92690	99.94520	99.71800	99.74470	99.94452	99.73636	99.84044	0.10408
VLC	97.23310	97.76960	98.25520	99.27000	99.57540	99.41015	97.43117	98.42066	0.98949

NOTE: * Based on the requirements of the Regulatory Reset Issues Paper (Sec. 7.2.1)

Table C.3 : Summary of Frequency and Voltage Power Quality

SYSTEM AVAILABILITY

Grid	Year	Planned			Unplanned			Total		
		Transformer, in percent	Transmission Line, in percent	Transformer and Transmission Line , in percent	Transformer, in percent	Transmission Line, in percent	Transformer and Transmission Line, in percent	Transformer, in percent	Transmission Line, in percent	Transformer and Transmission Line, in percent
PHILIPPINES	2000	100.00	99.98	99.94	99.86	99.78	99.19	99.86	99.76	99.13
	2001	99.99	99.98	99.93	99.92	99.85	99.48	99.91	99.83	99.41
	2002	99.88	99.96	99.75	99.95	99.86	99.52	99.83	99.81	99.27
	2003	99.98	99.97	99.89	99.84	99.82	99.30	99.82	99.79	99.19
	2004	99.98	99.96	99.87	99.86	99.81	99.29	99.84	99.78	99.16
LUZON	2000	99.99	99.90	99.93	99.97	99.13	99.93	99.38	99.68	99.13
	2001	99.97	99.92	99.93	99.97	99.33	99.93	99.80	99.73	99.40
	2002	99.25	99.79	99.64	99.25	99.32	99.64	98.98	99.76	99.07
	2003	99.91	99.91	99.91	99.91	99.31	99.91	99.06	99.77	99.18
	2004	99.92	99.86	99.88	99.92	99.14	99.88	99.69	99.87	99.17
VISAYAS	2000	100.00	99.75	99.85	100.00	99.02	99.85	100.00	99.34	99.25
	2001	99.99	99.90	99.93	99.99	98.54	99.93	99.99	99.28	99.01
	2002	100.00	99.91	99.88	100.00	98.68	99.88	100.00	99.15	99.04
	2003	99.99	99.77	99.85	99.99	98.39	99.85	99.99	99.25	98.84
	2004	99.98	99.74	99.80	99.98	99.05	99.80	99.98	99.69	99.10
MINDANAO	2000	100.00	100.00	100.00	100.00	98.46	100.00	98.98	99.47	98.56
	2001	99.91	99.90	99.90	99.91	99.65	99.90	98.65	99.77	99.37
	2002	99.90	99.84	99.85	99.90	99.74	99.85	99.83	99.88	99.62
	2003	99.82	99.82	99.82	99.82	99.08	99.82	99.20	99.85	98.96
	2004	99.86	99.85	99.86	99.86	99.40	99.86	97.53	99.85	98.88

Table C.4 : Summary of System Availability

Table C.5 : System Availability

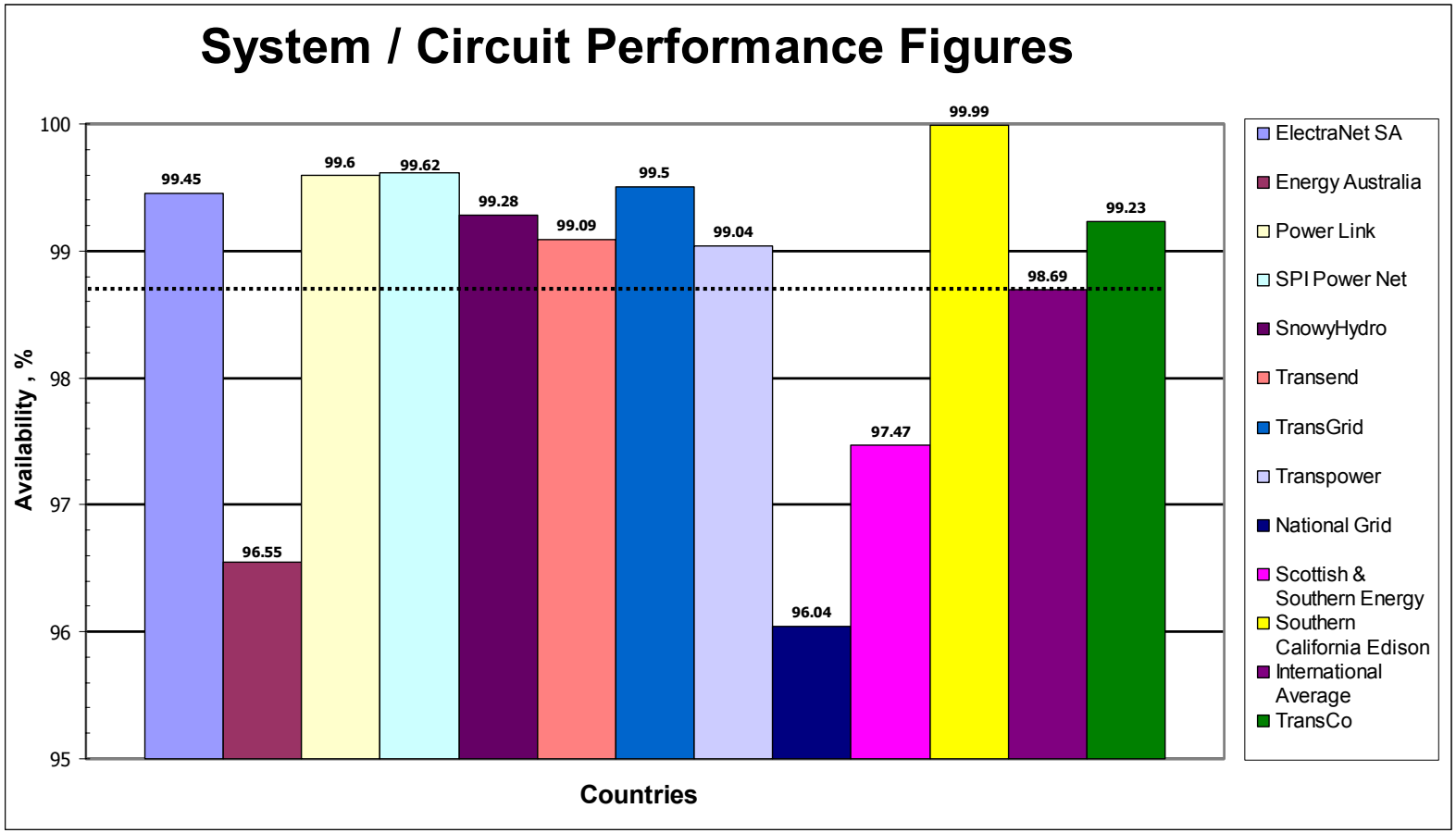


Table C.6 : System and Circuit Performance Figures

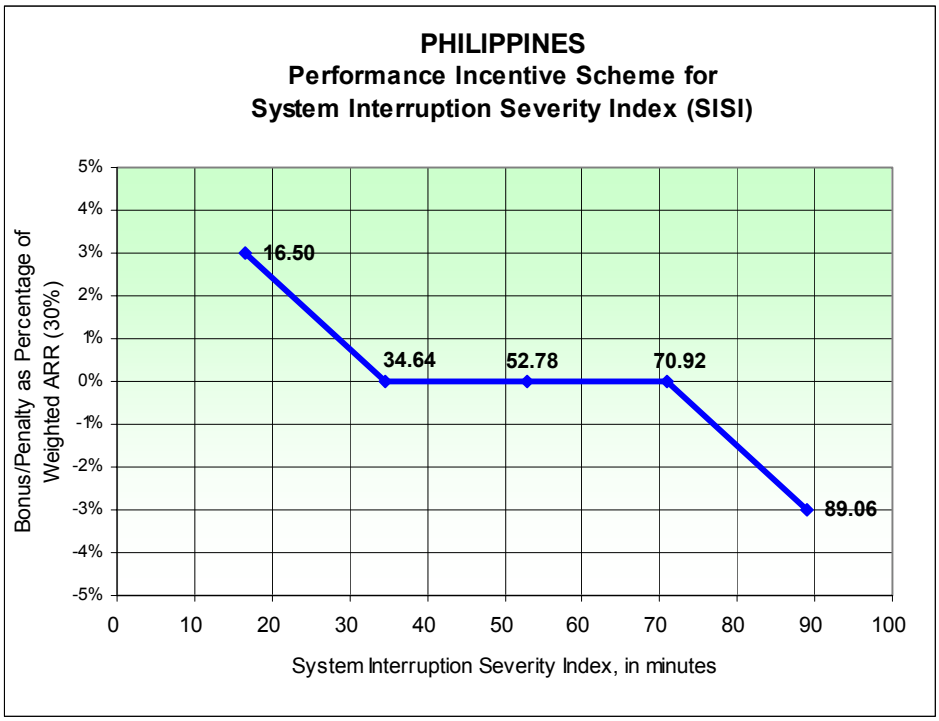
System / Circuit Performance Figures

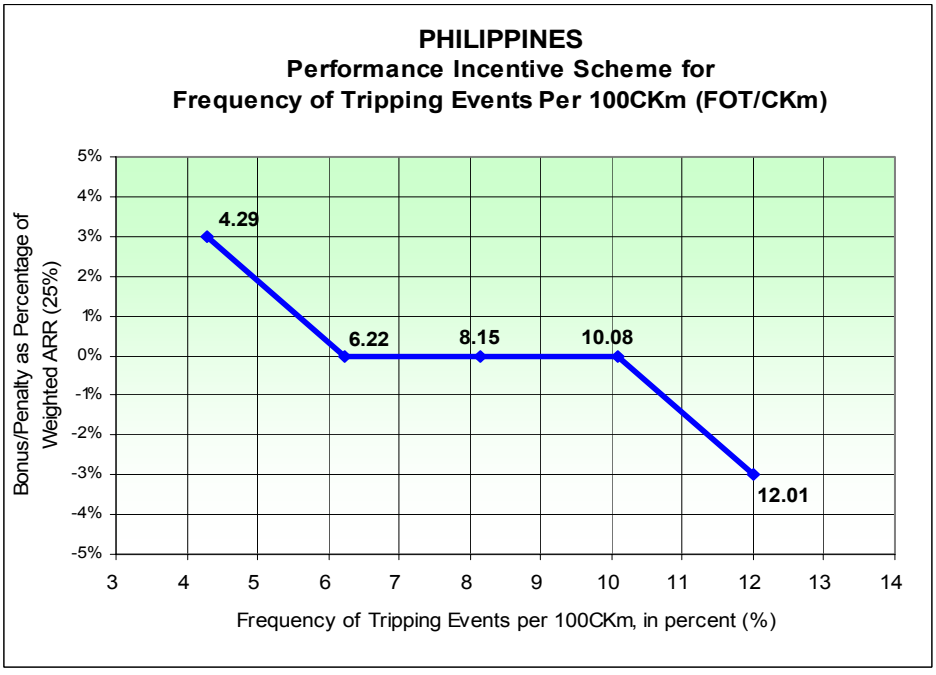
Transmission Companies	Country	Actual		Remarks
		Availability, %	Unavailability, %	
ElectraNet SA	AUSTRALIA	99.45	0.55	Four-year Average
Energy Australia		96.55	3.45	Two-year Average (CY2000 – 2001)
Power Link		99.6	0.4	Two-year Average (CY1999 – 2000)
SPI Power Net		99.62	0.38	Five-year Average
SnowyHydro		99.28	0.72	Three-year Average
Transend		99.09	0.91	Three-year Average
TransGrid		99.5	0.5	Five-year Average
Transpower	NZ	99.04	0.96	Five-year Average
National Grid	UK	96.04	3.96	Five-year Average
Scottish & Southern Energy		97.47	2.53	Five-year Average
Southern California Edison	USA	99.99	0.01	Five-year Average
International Average		**98.69**	**1.31**	
TransCo	PHIL	99.23	0.77	Five-year Average

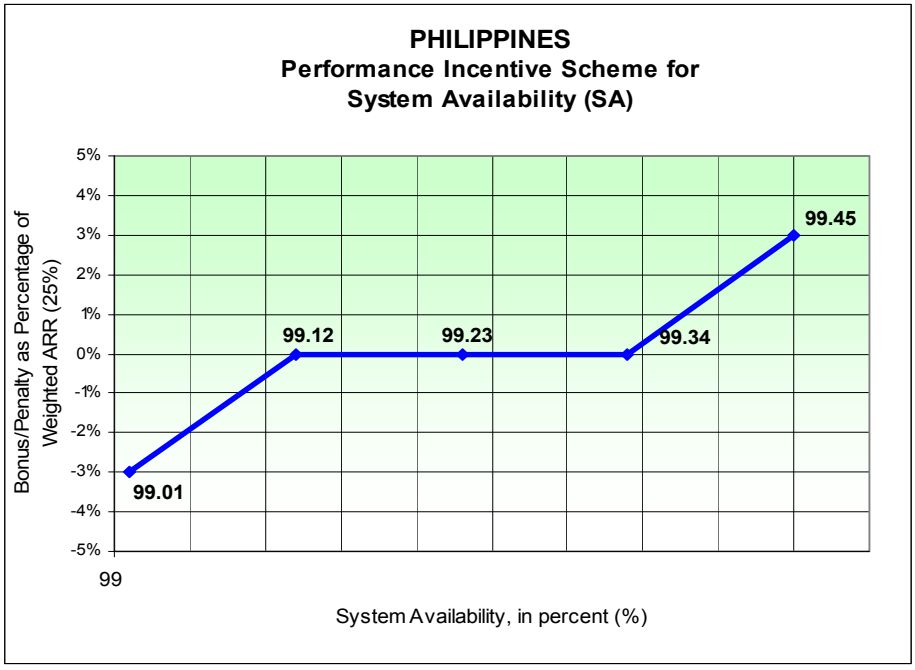
Source:

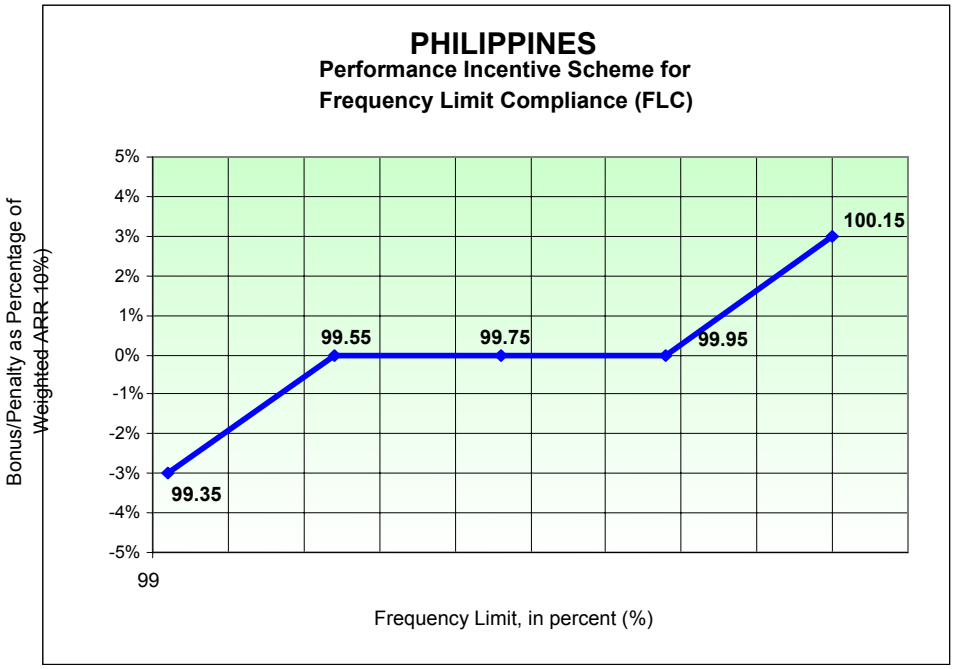
SKM Paper for Standard Performance Reporting

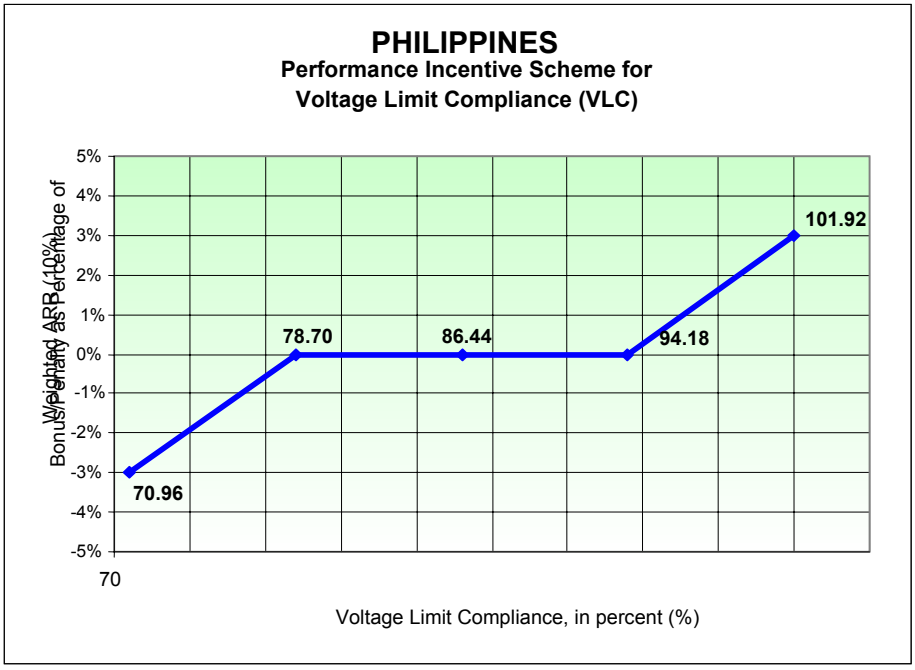
APPENDIX C – ANNEX A : PIS Proposed by TRANSCO / PSALM






PHILIPPINES
Performance Incentive Scheme for
System Availability (SA)
Bonus/Penalty as Percentage of Weighted ARR (25%)
5%
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
99.01
99.12
99.23
99.34
99.45
99
System Availability, in percent (%)


PHILIPPINES
Performance Incentive Scheme for
Frequency Limit Compliance (FLC)
Bonus/Penalty as Percentage of Weighted ARR (10%)
5%
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
99.35
99.55
99.75
99.95
100.15
99
Frequency Limit, in percent (%)


PHILIPPINES
Performance Incentive Scheme for
Voltage Limit Compliance (VLC)
Bonus Percentage of Weighted ARR (10%)
5%
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
70
70.96
78.70
86.44
94.18
101.92
Voltage Limit Compliance, in percent (%)

APPENDIX C – ANNEX B

Bandwidth of the Proposed Performance and Incentive Scheme

Reward and Penalty Mechanism

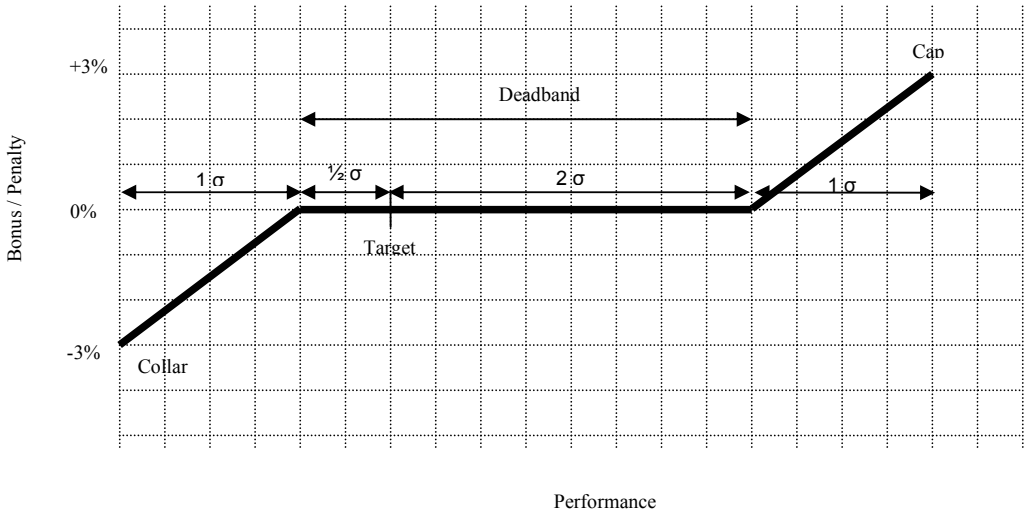
Performance Incentive Schemes	Collar (Penalty)	Deadband			Cap (Reward)
		Low	Mean	High	
	-3%	*0%*	*0%*	*0%*	*3%*
System Interruption Severity Index (SISI)	89.06	70.92	52.78	34.64	16.50
Frequency of Tripping Events Per 100 CKm (FOT/100CKm)	12.01	10.08	8.15	6.22	4.29
System Availability (SA)	99.01	99.12	99.23	99.34	99.45
Frequency Limit Compliance (FLC)	99.35	99.55	99.75	99.84	99.93
Voltage Limit Compliance (VLC)	70.96	78.70	86.44	89.90	93.36

Year	System Interruption Severity Index (SISI), in minutes	Frequency of Tripping Events Per 100 CKm (FOT/100CKm)	System Availability (SA), in percent (%)	Frequency Limit Compliance (FLC), in percent (%)	Voltage Limit Compliance (VLC), in percent (%)
2000	56.64	10.75	99.13	99.91	77.12
2001	38.19	9.20	99.41	99.92	79.19
2002	38.24	8.05	99.27	99.85	89.54
2003	48.71	6.99	99.19	99.51	93.20
2004	82.11	5.77	99.16	99.55	93.14
MEAN	52.78	8.15	99.23	99.75	86.44
STDEV	18.14	1.93	0.11	0.20	7.74

Source: Performance Indices for Transmission Service (Based on SPM-IS Database)

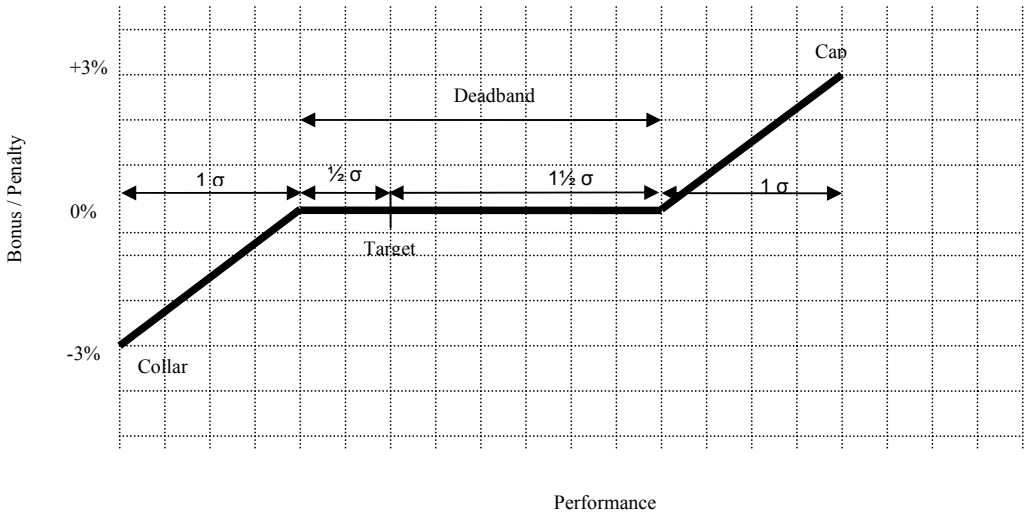
APPENDIX C – ANNEX C

Profile Graph of the Standard Deviation each Performance Measure



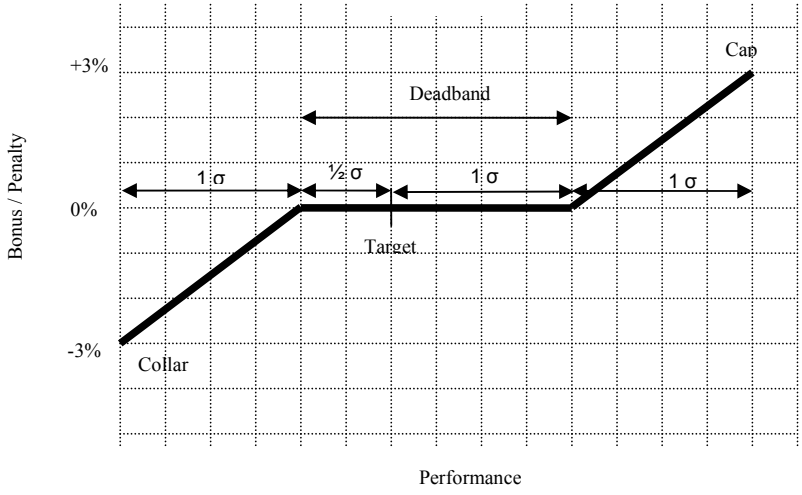
Luzon : SA

Visayas : FOT and SA



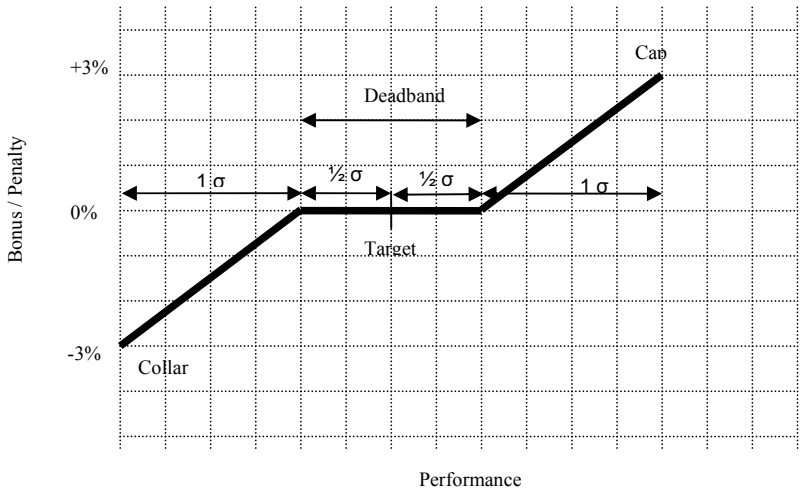
Luzon : FOT

Mindanao : FOT



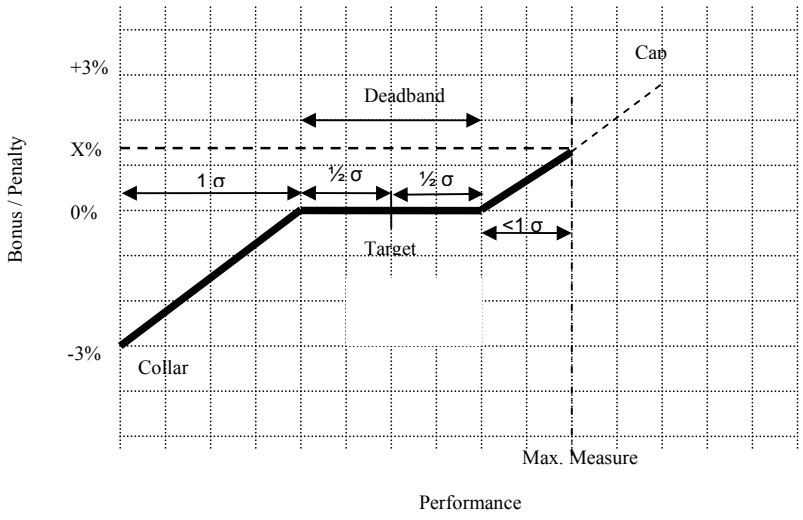
Luzon : SISI

Mindanao : SA



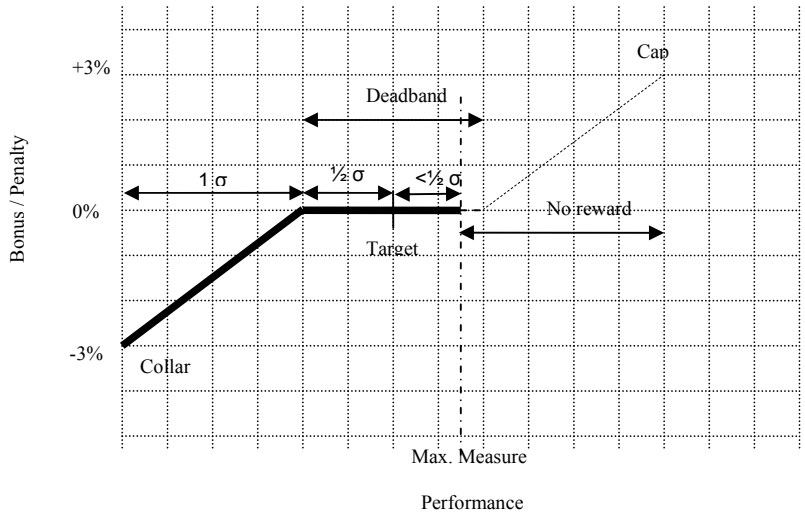
Luzon : VLC

Mindanao : SISI, FLC and VLC



Luzon : FLC

Visayas : SISI and FLC


+3%
0%
-3%
Bonus / Penalty
Cap
Deadband
1 σ
½ σ
<½ σ
No reward
Target
Collar
Max. Measure
Performance

Visayas : VLC

APPENDIX D

LOAD BREAKDOWN BY GRID

Dist.	Grid/Area	2004 [2a/]	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	LUZON	**6,459**	**7,343**	**7,964**	**8,635**	**9,372**	**10,171**	**11,018**	**11,917**	**12,871**	**13,884**	**14,959**
	MERALCO	**4,709**	**5,086**	**5,531**	**5,995**	**6,530**	**7,105**	**7,718**	**8,367**	**9,055**	**9,788**	**10,568**
	NCR	3,616	3,859	4,197	4,383	4,774	5,194	5,642	6,117	6,620	7,156	7,726
	North	212	248	269	300	326	355	386	418	452	489	528
	South	881	980	1,065	1,312	1,430	1,555	1,689	1,832	1,982	2,143	2,313
	NLRC	**1,234**	**1,563**	**1,689**	**1,837**	**1,978**	**2,140**	**2,311**	**2,494**	**2,690**	**2,897**	**3,122**
1	Ilocos	118	154	169	182	197	213	229	247	267	287	309
2	Mt. Province	104	122	130	139	150	161	173	186	199	212	227
3	North Central	236	317	344	373	406	441	479	520	564	611	662
4	Cagayan Valley	111	144	157	170	186	203	221	241	262	285	310
5	West Central	204	244	265	288	314	341	370	400	433	468	505
6	South Central	396	499	537	594	630	681	735	792	854	919	990
7	North Tagalog	65	84	87	91	95	100	103	107	111	115	119
	SLRC	**516**	**694**	**743**	**803**	**864**	**926**	**990**	**1,057**	**1,127**	**1,199**	**1,269**
1	Batangas/Cavite	268	361	391	424	456	489	522	556	592	628	660
2	Laguna/Quezon	100	135	139	148	157	167	176	186	196	206	217
3	Bicol	148	198	213	232	251	271	292	315	339	365	392
	VISAYAS	**1,029**	**1,113**	**1,170**	**1,238**	**1,308**	**1,383**	**1,463**	**1,550**	**1,644**	**1,742**	**1,849**
1	Panay	192	200	211	224	238	251	265	280	295	311	329
2a	Cebu	417	468	489	516	545	576	611	648	688	730	776
2b	Bohol	54	59	63	69	74	80	87	94	101	110	119
3	Leyte-Samar	167	184	194	205	216	228	239	256	269	283	299
4	Negros	199	203	213	223	234	247	261	273	291	308	327
	MINDANAO	**1,199**	**1,371**	**1,458**	**1,535**	**1,615**	**1,697**	**1,784**	**1,884**	**2,001**	**2,124**	**2,256**
1	North Western	173	192	204	222	238	255	272	292	315	340	361
2	Lanao Area [3/]	182	249	283	295	302	310	318	329	342	357	373
3	North Central [3/]	182	219	225	220	237	245	254	265	278	291	306
4	North Eastern [3/]	136	148	155	166	175	187	198	210	225	240	257
5	South Eastern	334	366	381	403	416	436	458	483	512	541	574
6	South Western	192	198	211	229	247	265	283	305	329	355	385
	PHILIPPINES	**8,687**	**9,828**	**10,592**	**11,408**	**12,295**	**13,251**	**14,265**	**15,350**	**16,516**	**17,750**	**19,064**

Note:

[2/] - Based on the transformer peak demand coincident with the System Peak.

[2a/] - Actual System Peak per grid including embedded generation; Demand level per District proportionate to the peak demand of the substations within the District.

[3/] - Includes some substations that serve another District

Table D.1 : Forecast Breakdown of SPD by Grid / Area (MW)

Source : DoE Draft TDP for 2005