

**It's the Capital Recovery Scheme - Stupid**  
or  
**A Theoretical Basis for Potential Price Reductions In Transition to Private Ownership of Philippine Electric Generation**

**James A. Nichols, III**  
**Navigant Consulting, Inc.**  
**August 2000**

*Disclaimer*

*This is not a position paper of Navigant Consulting, Inc. It is a presentation of selected theoretical viewpoints with the intent of facilitating the discussion and decision making process by the appropriate entities and individuals*

Can prices decline with the privatization of National Power Company (Napocor) assets? What exactly gives the private sector the capability to price below what the national government is able to do? Will the private sector not require higher returns on its capital than the government and in addition have to pay income taxes?

Most commonly we hear that the private sector can be more efficient and obtain more competitively priced resources than the national government and these will offset its higher capital costs and taxes. Many people have significant doubts about this. In any event, these efficiencies would expectedly take several years to achieve. Does this mean that prices cannot drop in the immediate term or will they potentially have to rise over what the government could otherwise price services?

The answer lies not in efficiencies (though these are possible) but in an examination of the capital recovery scheme employed by the government sector. Particularly, we will examine the time-path of this recovery and how that might differ under private sector capital recovery practices.

## **Capital Recovery**

Investors in fixed assets like electric generating plant do not recover their investment in one year through prices – it takes many years. Therefore they seek not only a *return of* their investment, they seek a *return on* the amount of investment that is not yet recovered from ratepayers and is still tied up in the asset investment. It's not unlike consumer credit. If you borrow P10,000 for ten years, you may be asked to pay P1,000 per year for ten years plus you pay interest on the amount you have not paid off yet – the remaining balance each year. The P1,000 a year is the *return of* capital and the interest is the *return on* capital.

The Energy Regulatory Board (ERB) sets electric prices in the Philippines using a *return on rate base* methodology. In this methodology, consumers pay an annual depreciation (the return of capital) plus a return on rate base (return on capital). Rate base is essentially the un-recovered (that is, not yet recovered through depreciation) investment. However, the Philippines employs a concept sometimes referred to as *price level depreciation*. In this method, the rate base, instead of being tracked at original cost, is revalued each year to current price levels. It is a *revalued rate base*.

Price level accounting is commonly employed by electric utilities in developing countries, particularly where there are relatively high rates of local currency inflation. Under price level accounting, the utility

will recover, through depreciation, an amount not equal to its original investment but rather an amount equal to the original investment adjusted for inflation. Part of the rationale for this is that it provides enough funds to replace the asset after it is retired. Without going into any further discussion of the flaws or benefits of this, we will just state that this is the method currently used in the Philippines.

The following table demonstrates how existing Napocor prices are set for a 20-year asset costing P10,000.

**National Power Corporation Price Level Accounting**

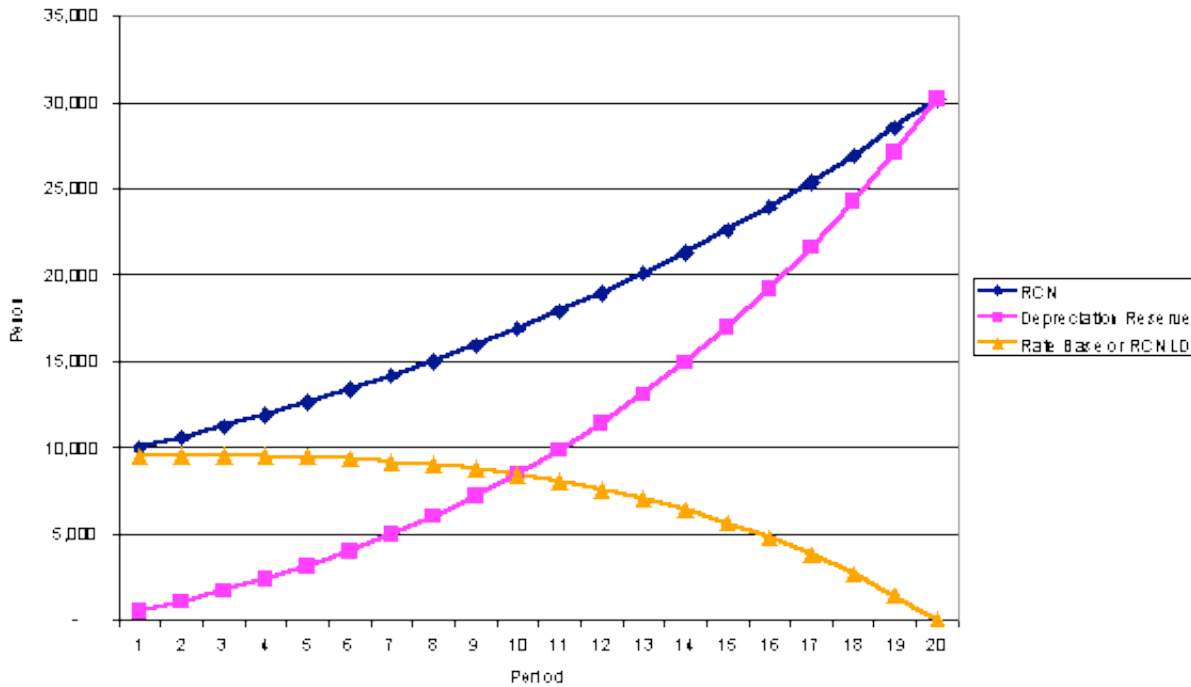
Period	Index	RCN	Depreciation Reserve (revalued)	Depreciation	Rate Base or RCNLD	Purchasing Power of Depreciation	Return on Rate Base @ 8%	Depreciation + Return
1	1.00	10,000	500	500	9,500	500	760	1,260
2	1.06	10,600	1,060	530	9,540	500	763	1,293
3	1.12	11,236	1,685	562	9,551	500	764	1,326
4	1.19	11,910	2,382	596	9,528	500	762	1,358
5	1.26	12,625	3,156	631	9,469	500	757	1,389
6	1.34	13,382	4,015	669	9,368	500	749	1,419
7	1.42	14,185	4,965	709	9,220	500	738	1,447
8	1.50	15,036	6,015	752	9,022	500	722	1,474
9	1.59	15,938	7,172	797	8,766	500	701	1,498
10	1.69	16,895	8,447	845	8,447	500	676	1,521
11	1.79	17,908	9,850	895	8,059	500	645	1,540
12	1.90	18,983	11,390	949	7,593	500	607	1,557
13	2.01	20,122	13,079	1,006	7,043	500	563	1,570
14	2.13	21,329	14,930	1,066	6,399	500	512	1,578
15	2.26	22,609	16,957	1,130	5,652	500	452	1,583
16	2.40	23,966	19,172	1,198	4,793	500	383	1,582
17	2.54	25,404	21,593	1,270	3,811	500	305	1,575
18	2.69	26,928	24,235	1,346	2,693	500	215	1,562
19	2.85	28,543	27,116	1,427	1,427	500	114	1,541
20	3.03	30,256	30,256	1,513	-	500	-	1,513
				18,393		10,000		

The table shows the annual inflation index and the Replacement Cost New (RCN) of the asset. RCN is the revalued original cost of the plant. This table also shows the annual depreciation amount<sup>[1]</sup>. The rate base is essentially the *replacement cost new less accumulated depreciation* (RCNLD) - Napocor and ERB refer to this as Sound Value.

As shown, although the total amount collected through depreciation is P18,393, the purchasing power of the depreciation expense (in real pesos) totals P10,000. Also note that in this method, not only is the original cost and the annual depreciation adjusted each year for inflation, but so is the Depreciation Reserve.

The following chart plots the annual account balances for RCN, Depreciation Reserve, and the resulting Rate Base or RCNLD.

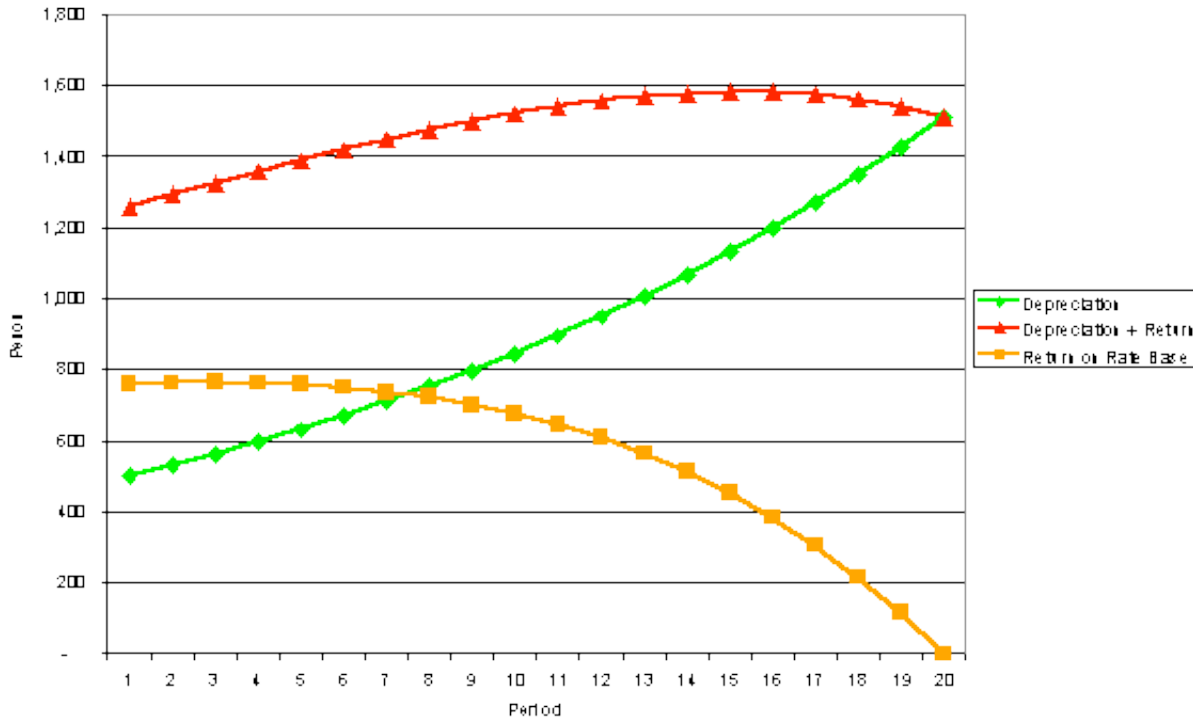
### National Power Corporation Price Level Accounting



A significant observation about this chart is that Rate Base, for this example asset, stays very high over the first 8-9 years of the asset's life and declines slowly over the middle part of its life. Only in the last few years does rate base decline rather quickly.

The following chart shows the capital recovery profile for this example asset. The sum of Depreciation plus Return on Rate Base is what is allowed in electricity tariffs for capital recovery.

**Capital Recovery Profile**



**Private Sector Capital Recovery**

How would a private sector price capital recovery for this asset? Typically, private power producers with long-term contracts price at a level annual amount over the life of the asset for capital recovery, where capital recovery includes return of capital, return on capital, and income taxes.

For illustrative purposes, assume the private entity can finance this project with 80% debt, 20% equity, and a cost of debt equivalent to Napocor’s rate of return of 8%. Furthermore, assume that the private entity requires a 15% return on its equity and is faced with a 35% income tax rate.

The following table shows the level annual capital recovery revenue amount required to achieve the 15% return on equity. The debt term is set at 80% of the life of the asset (typical practice) with level principal payments.

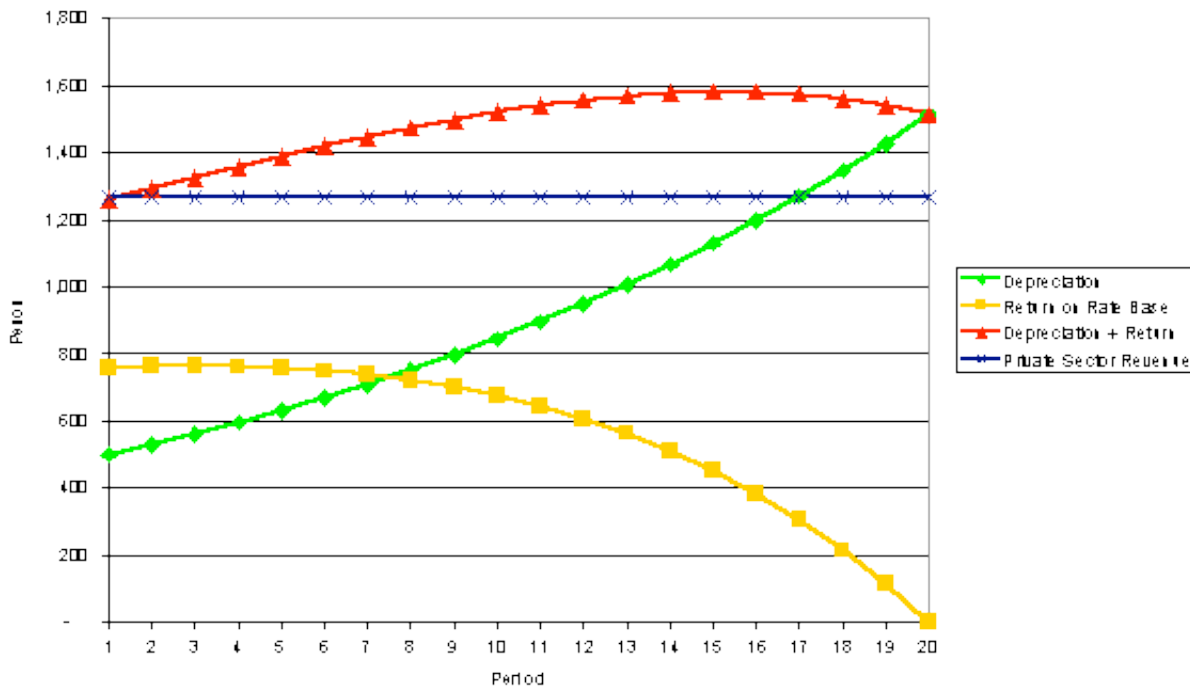
## Private Sector Pricing

Period	Revenue	Original Cost	Tax Depreciation SYD	Principal Payment	Balance	Interest	Tax	Tax Loss Carry Forward	Tax Paid	Total Cash Expenditure	Net Cash Flow
					8,000						(2,000)
1	1,268	10,000	952	500	7,500	600	(99)	(99)	-	1,100	168
2	1,268	10,000	905	500	7,000	560	(69)	(168)	-	1,060	208
3	1,268	10,000	857	500	6,500	520	(38)	(206)	-	1,020	248
4	1,268	10,000	810	500	6,000	480	(7)	(214)	-	980	288
5	1,268	10,000	762	500	5,500	440	23	(191)	-	940	328
6	1,268	10,000	714	500	5,000	400	54	(137)	-	900	368
7	1,268	10,000	667	500	4,500	360	85	(52)	32	892	376
8	1,268	10,000	619	500	4,000	320	115	-	115	935	333
9	1,268	10,000	571	500	3,500	280	146	-	146	926	342
10	1,268	10,000	524	500	3,000	240	177	-	177	917	352
11	1,268	10,000	476	500	2,500	200	207	-	207	907	361
12	1,268	10,000	429	500	2,000	160	238	-	238	898	370
13	1,268	10,000	381	500	1,500	120	269	-	269	889	380
14	1,268	10,000	333	500	1,000	80	299	-	299	879	389
15	1,268	10,000	286	500	500	40	330	-	330	870	398
16	1,268	10,000	238	500	-	-	361	-	361	861	408
17	1,268	10,000	190				377	-	377	377	891
18	1,268	10,000	143				394	-	394	394	874
19	1,268	10,000	95				411	-	411	411	858
20	1,268	10,000	48				427	-	427	427	841
			10,000	8,000						NPV @ 15% ==>	(0)

This table shows that an annual capital recovery of P1,268 is required.

Superimposing this on the previous Napocor requirements chart gives the following chart. Note that the private entity can price at approximately the same amount as Napocor in the first year or two, even though its cost of capital is higher and it is paying income tax. Thereafter, it can price substantially less. Part of the reason is that it is trying to recover its investment only and not an amount required for replacing its investment.

### NPC vs Private Sector Capital Recovery Profile

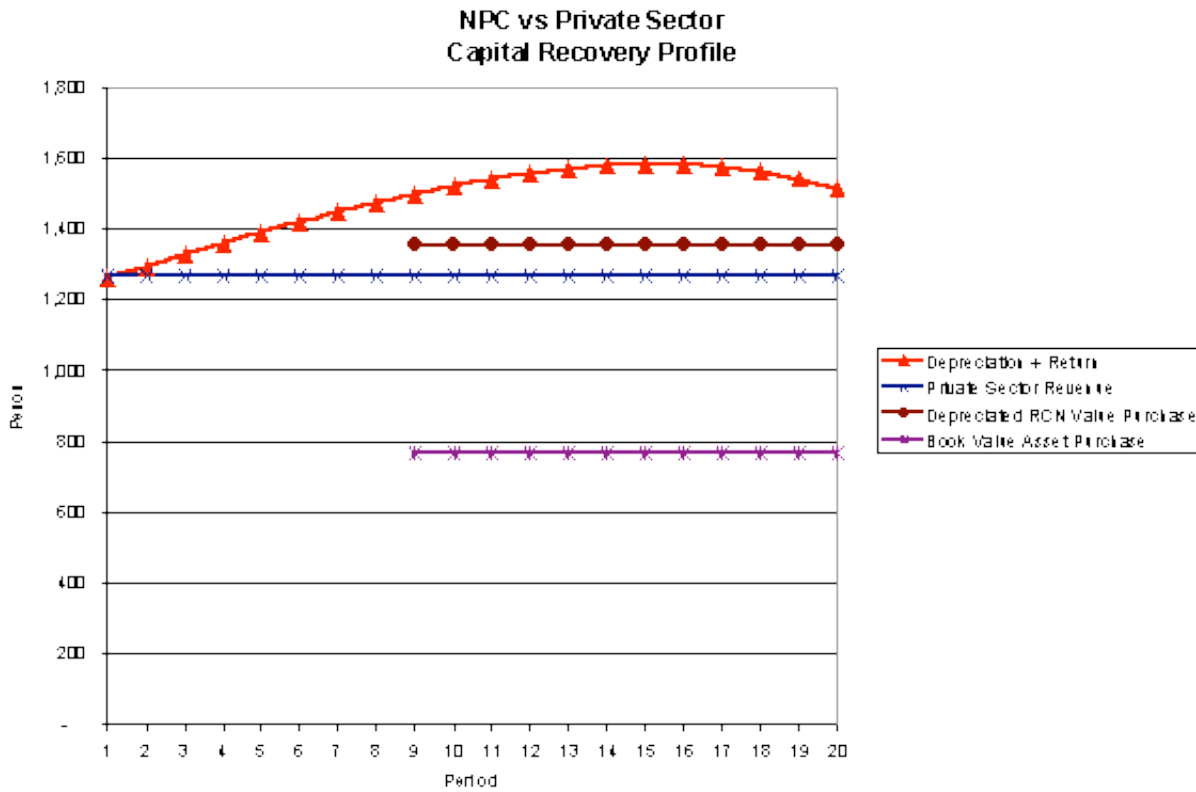


The point of interest in this discussion, however, is that if a brand new asset is being privatized, there is very little flexibility to drop prices in the immediate first year or two, though there may be no need for substantial price increases.

However, most of Napocor's assets are not brand new and privatization of older units presents much more flexibility for price reductions.

Let us assume this same 20-year asset is 8 years or 40% into its life, with 12 years or 60% of its life remaining. Let us further assume that the value of the asset is approximately 60% of its RCN original value of P15,036 or P9,021. This is a fairly conservative assumption; as can be seen from Table 1, Napocor would have already recovered from ratepayers P4,949 of its original P10,000 investment through depreciation over the first 8 years and should, therefore, be willing to sell it at only P5,051 without hurting ratepayers. The point is that 60% of revalued original cost is probably a conservatively reasonable estimate of its value at year 8.

A private sector participant will refinance the P9,021 purchase price over 10 years and, using an analysis similar to that presented above, it can be shown that the level annual capital recovery required to generate a 15% return on equity with 35% income taxes is P1,355. Plotting this amount on the Napocor recovery chart gives the following and shows that such a transaction can have significant first year pricing reductions compared to what Napocor would otherwise have charged in rate base recovery for that asset – about 9.5% reduction in the first year (year 9 of the asset's life). Should Napocor sell the asset at its book cost of about P5,000, 40% first year reductions can be achieved.



## Conclusion

The Energy Regulatory Board, or at least the legislature, can change capital recovery schemes employed by the government sector. Privatization is not required to accomplish this. However, that is not the choice the Philippine public is now faced with. They are being presented with two choices – continue existing return on rate base regulation by Napocor or allow for privatization. This paper demonstrates that the second choice implicitly provides for a change in capital recovery mechanisms that can potentially allow for reductions in the price of electricity in the early years of the privatization.

What is required to make this happen, however, is that the legal and regulatory environment be such that private entities can indeed achieve the financial structures postulated here. Should there be great uncertainty or lack of investor confidence, much higher equity ratios may be required from the banks financing the privatization debt placements and/or higher cost of debt and higher required equity returns.

[1] Under current Napocor practices, depreciation is essentially the Sound Value amortized on a straight-line basis over the remaining useful life.