## Generation Cost of Capital Assumptions for NYISO ICAP Demand Curve June 8, 2009

## I. Initial NERA Proposal

At the April 22, 2010 ICAP Working Group meeting, NERA proposed using a weighted average cost of capital (WACC) of 9.50% for merchant generators to establish the ICAP demand curve. This WACC was based on an assumed corporate capital structure for a generation company consisting of 50% debt and 50% equity with a 7.0% cost of debt and a 12.0% cost of equity.

The cost of debt was based upon a range of 6.50%<sup>i</sup> to 7.25%<sup>ii</sup>, which reflected the average yield on long-term BBB and BB corporate bonds of 6.28% and 7.04%, respectively, as of April 15, 2010, adjusted upward slightly to reflect the likelihood that a merchant generator would be at the lower end of either ratings level.

The cost of equity was based upon a range of 10.33% to 13.26% derived using the capital asset pricing model (CAPM). The low end of this range was based upon a risk-free rate of 3.86% (10-year US treasury yield as of April 15, 2010) and an equity beta of 1.0 (equal to the beta used in the 2007 demand curve). The high end of the range was based upon a risk-free rate of 4.72% (30-year US treasury yield) and an estimated equity beta of 1.32 for a generation company with 50% debt leverage. A market risk premium of 6.47% was used in each of the CAPM calculations<sup>iii</sup>.

The 1.32 equity beta used for the high end of the range was based on the equity betas reported in the Value Line Investment Survey for AES, NRG, and RRI<sup>iv</sup>. The Value Line beta for each of these companies was converted to an equity beta by adjusting to remove the effects of the actual financial leverage employed by each company. The average asset beta was then re-levered assuming a 50% debt ratio to determine the estimated equity beta consistent with the BBB credit rating assumption.

## II. Comments and Key Issues

Based on stakeholder comments received thus far, it appears there is general agreement that the cost of capital should be based on a merchant generation business model and that a CAPM approach is reasonable for establishing the cost of equity. However, the stakeholders have raised a number of issues concerning specific assumptions used in NERA's initial (April 22, 2010) proposal.

Additionally, there are differences as to whether a merchant model means a merchant plant built as part of a generation portfolio or a single project financed on a merchant basis. This issue will be addressed in more detail later in this report.

US Power Generating Company, NRG Energy (NRG), and TC Ravenswood (the "Responding Generators") contend that the cost of capital should be based upon a B credit rating to reflect the assumed rating for a stand-alone project, significant upfront fees should be included in the cost of debt, debt amortization should be sufficient to leave only \$150-\$200/kW of debt outstanding

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after a 7-year debt maturity, and the implied cost of equity after risk adjustments should be in the range of 16-18%.

The Transmission Owners, NYPA, and LIPA (the "TOs") state that the cost of capital should be based on a corporate capital structure that most likely will be used rather than a stand-alone project financing, the cost of debt should reflect a combination of bonds and lower-cost bank debt, and the equity beta should be no greater than the 1.0 used in the 2007 demand curve.

Competitive Power Ventures (CPV) believes that NERA's assumptions are reasonable for a project with a long-term power sales agreement, but asserts that a project with a shorter-term hedge (*e.g.*, 5 years) would require a lower debt amount, a higher debt cost and a higher ROE. CPV doubts that a pure merchant plant could be financed economically, if at all, due to even lower leverage potential, higher interest rates, and a higher equity return requirement.

## III. Evaluation of Stakeholder Comments

Based on the feedback from the stakeholders, NERA believes there are four major issues that have been raised concerning our initial proposal. The issues and our proposed resolution are as follows:

a) Corporate versus project financing – We agree with the TOs that a merchant generator project would likely be financed on balance sheet as part of a larger corporate entity, rather than as a stand-alone project entity. Indeed, as noted by CPV, it is unlikely in the current capital market that this type of merchant project could be financed as a standalone project. As a result, we believe the best starting point for determining financing assumptions is to consider the capital structure and cost of capital for the publicly traded, unregulated generation companies with assets that are most similar to the demand curve unit project (i.e., The AES Corporation (AES), NRG, RRI Energy (RRI), Calpine (CPN), and Mirant (MIR)). We also believe it is important to recognize, as the Responding Generators point out, that a stand-alone peaking plant is likely to involve greater business risk than the average of the assets owned by these generation companies. These business risks include development and construction risk (as compared with these generating companies, which have large portfolios of operating assets), the duty cycle of the plant (peaking unit versus portfolios of baseload, intermediate, and peaking assets), and the plant's pure market exposure (versus at least partial hedging of the power at most of the generation companies). While it is difficult to precisely determine the appropriate adjustments to recognize these risks, we recommend adopting a slightly lower debt ratio, slightly higher cost of debt, and slightly higher cost of equity than the observed values for the generation companies in order to establish the financial parameters for the peaking project that underlies the demand curve. We believe that it would not be reasonable to base the financial parameters on the narrow assumption of how a single project could be financed in isolation of a larger generation company. It is reasonable, however, to base the parameters on how a generation company could finance the project, allowing for a modicum of risk that may be unique to the peaker project. Hence, we use a merchant approach but not a standalone project approach. Note that we use as comparables companies that are predominantly in the electric generation business but are not affiliated with transmission

and distribution companies. There are also a number of corporate developers of merchant generation that are part of entities that also have regulated transmission and distribution businesses. We do not use the generation companies that are affiliated with transmission and distribution companies as comparables because the financial parameters associated with their generation businesses cannot be observed separately in the market.

Appendix A provides the key financial parameters for the five publicly-traded generation companies listed above. Three of these companies have Standard & Poor's Financial Services, LLC (S&P) senior secured ratings of BB or BB+ (AES, NRG, and RRI), while the other two are very similar (CPN is B+ and MIR has a LT issuer rating of B+, equivalent to a senior secured rating of BB). We believe it is reasonable to focus on senior secured ratings since the project could be used as collateral in a bond financing. These companies have an average debt ratio of 63% (excluding AES, which has a 74% debt ratio but is comprised of significant transmission and distribution utility and longterm contract assets). These debt ratios are based on market value capital structure ratios (market value of equity and, as a simplifying assumption, book value of debt). The average market value debt ratio is somewhat higher than the average debt ratio on a book value basis. The market value capital structure ratios are appropriate to use since we are attempting to estimate the market-required cost of capital. We believe it is reasonable to assume that these generation companies with approximately BB ratings could finance a peaking plant on-balance sheet using 50% debt without impacting their credit ratings. Consistent with this assumption, we recommend using a debt cost of 7.25%. This cost is based on the Barclays Capital index yield for BB US corporate debt of 7.04% as of April 15, 2010, adjusted upward slightly to reflect the higher risk associated with the project.

We have reviewed the terms of the recent \$1.3 billion term loan financing obtained by Calpine to finance its acquisition of 4,490 MW of generation assets from Pepco. This transaction is a relevant comparable because the assets are at least partially dependent on revenues from the capacity market. These assets face no construction risk, but construction risk is not likely a major differentiating factor since the construction risk associated with a peaking project is lower than for many other types of generating assets. The Calpine financing is a 7-year term loan priced at LIBOR plus 550bp with a 150bp LIBOR floor. While this pricing may appear high for a 7-year term, we note that the debt appears to fund over 78% of the purchase price. Given this high leverage, we do not believe this information suggests a higher cost of debt than we assumed for the demand curve project.

The Calpine financing also includes a debt amortization schedule that will reduce debt to approximately \$160/kW at its maturity. Since we are assuming in the demand curve that the financing is accomplished through an upstream corporate entity (that is, rather than on a project basis) and is long-term, we do not believe it is necessary to adjust the amortization to achieve a target debt per kW amount at the end of a hypothetical interim debt maturity. Instead, our assumptions result in full debt amortization over the assumed life of the asset. It is worth noting, however, that the Calpine financing would leave the debt ratio at about 44% at maturity, or only modestly lower than our proposed 50% initial debt ratio assumption. We recognize that our amortization assumption would

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likely not be feasible with a bank loan or to finance a stand-alone merchant project. However, we do not believe that merchant implies project finance. Instead, we believe that the least cost financing option is likely to be the addition of the project to an existing merchant portfolio, albeit with a recognition of a somewhat higher cost of capital to compensate for the incremental risks.

- b) Up-front fees The Responding Generators state that upfront fees should be 350 to 450 basis points in today's market. Upfront fees include underwriting spread and legal, accounting, and rating agency fees. These fees have been included in the total cost estimate for the project by S&L in an amount equal to 2% of the EPC cost. This amount equates to approximately 320 bp on the debt amount, since the EPC cost is about 80% of the total project cost and we assume a 50% debt ratio (2%\*80%/50%).
- c) **Bank financing -** The TOs note that merchant generation companies typically use a combination of bank and bond financing and argue that our proposal to use only bond yields overstates the cost of debt. However, we would point out that bank financing typically has a much shorter maturity than bond financing, so including a component of bank financing would require that we also assume that up-front fees are incurred at regular intervals (e.g., every 5 years or so) during the life of the project. Bank financing would also involve interest rate risk during the term of the assumed loan unless we add the cost of an interest rate swap. Finally, bank financing would require an assumption about the level of interest rates at each refinancing. Since current short-term interest rates are well below the long-term average, it would be reasonable to assume higher rates for future refinancing of bank loans. Taking these considerations into account, we believe the all-in cost differential, if any, between bank and bond financing over the life of the project is likely to be much smaller than the difference between the initial annual interest costs of the two sources of financing might suggest. Since the long-term cost of bond financing can be more easily quantified using published data, we recommend using the BB index bond yield as the basis for the cost of debt.
- d) Equity beta in CAPM cost of equity –The TOs exclude RRI from their estimate of beta because, in their view, its high equity beta skews the sample. We do not believe RRI should be excluded merely because it has a high beta. Including RRI, the companies in our sample have an average asset beta of 0.48. However, AES is the least relevant comparable since it has significant regulated transmission and distribution utility businesses and long-term contract assets that likely contribute to a lower asset beta than a merchant generation business. Excluding AES, the average asset beta would be 0.52 for the group of companies with primarily merchant generation business with diverse portfolios and some hedged output. (See Appendix A). To check this result, we also looked at a sample of other companies that own both regulated transmission and distribution companies and merchant generation assets. The average asset beta for these companies is 0.46, which suggests that an asset beta in excess of 0.50 for a company primarily in the merchant generation business appears reasonable. Since it is reasonable to assume that the demand curve project would have a riskier business profile than the average of the merchant generation companies on Appendix A, we propose using an

asset beta of 0.60 for the project. Adjusting this asset beta for 50% debt leverage (market value basis) results in an equity beta of 1.20, and a cost of equity of 12.48%.

### **IV.** Revised Cost of Capital Recommendation

Based upon the points discussed in section III, and assuming a corporate financing structure and a credit rating of BB, we propose a using a 50% debt ratio, 7.25% cost of debt, 12.48% cost of equity and a resulting WACC of 9.87% as the financing assumptions for the generation project underlying the demand curve.

We have elected to continue to base bond yields on data from April 15, 2010. This date in retrospect seems to be a time of relative calm in capital markets. While an update could be performed easily, it would reflect the potentially transient reaction to the euro and Greek debt crisis. Additionally, there would be moves in different directions. Risk free interest rates have fallen, which would lower equity costs, while credit spreads have widened, which would raise the cost of debt.

The components of the WACC calculation are detailed below:

Debt/Capital	50%
Debt Cost	7.25%
Asset Beta	0.60
Equity Beta	1.20
Equity Risk Premium	6.47%
Risk-Free Rate (30 yr)	4.72%
Cost of Equity	12.48%
WACC	9.87%
Tax Rate (illustrative)	40.0%
Pretax WACC	14.03%

The Responding Generators stated that the cost of equity is considerably higher than 12.5%. However, it is important to note that had we assumed the project could be financed using 63% debt (equal to the average of the sample generation companies excluding AES), the cost of equity would have been 15.21% due to the greater financial leverage. However, the pre-tax WACC would have been 13.95% in that case due to the lower equity component and smaller allowance for taxes.

<sup>&</sup>lt;sup>i</sup> Federal Reserve Statistical Release. Selected Interest Rates (daily); Release Date April 16, 2010. Available at http://www.federalreserve.gov/releases/h15/update/.

<sup>&</sup>lt;sup>ii</sup> Factset, Barclays BB index US corporate bond yield (April 15, 2010).

<sup>&</sup>lt;sup>iii</sup> Ibbotson Associates Stocks, Bonds, Bills and Inflation 2008 Yearbook. (Long Horizon Equity Risk Premium from 1926 to 2008).

<sup>&</sup>lt;sup>iv</sup> The Value Line Investment Survey, Ratings and Reports, April 2, 2010.

# Appendix A Generation Company Ratings and Asset Betas

Capital structure (\$MM)							_			
	S&P LT	S&P Sr.	Equity							
0	Issuer	Sec.	Mkt		LT	Total		Equity	Asset	
Company	Rating	Rating	Сар	ST Debt	Debt	Debt	Debt/Cap	Beta	Beta	
Generation Companies										
AES	BB-	BB+	7,353	2,336	18,306	20,642	74%	1.20	0.32	
NRG	BB-	BB+	5,474	152	7,846	7,998	59%	1.15	0.47	
RRI	B+	BB	1,304	401	1,950	2,351	64%	1.65	0.59	
CPN	В	В+	5,266	305	9,239	9,544	64%	1.11	0.39	
MIR	B+	n/a	1,563	26	2,538	2,564	62%	1.63	0.62	
Average							65%		0.48	
Average	ex AES						63%		0.52	
Hybrid Utilities/Generation Companies										
AYE	BBB-		3,900	167	4,398	4,565	54%	0.95	0.44	
CEG	BBB-		7,060	78	4,220	4,298	38%	0.80	0.50	
D	A-		24,670	1,549	15,364	16,913	41%	0.70	0.42	
EXC	BBB		28,931	1,712	11,198	12,910	31%	0.85	0.59	
FE	BBB-		11,916	2,669	11,847	14,516	55%	0.80	0.36	
PPL	BBB		10,472	589	7,652	8,241	44%	0.70	0.39	
PEG	BBB		14,936	267	7,906	8,173	35%	0.80	0.52	
Average							43%		0.46	

Notes:

- a) Ratings from standardandpoors.com (retrieved June 1, 2010)
- b) Equity market capitalization and debt from Bloomberg.com as of March 31, 2010
- c) Equity betas from Value Line (April 2, 2010 and May 28, 2010), except for CPN and MIR which are from Yahoo Finance (not covered by Value Line)
- d) Assumes debt beta = 0