The Original Model

The model simulates revenues and expenditures for a gas turbine given a set of input parameters, energy functions, the region and the type of unit. The revenues are cash flows that the owner of a new unit would expect to receive over the thirty-year economic life of the unit. Similarly, the expenditures represent expenses and the required return on equity and debt. The model solves for the Demand Curve by finding demand (capacity) payments that satisfy the zero supernormal profit criteria (revenues equal expenditures). Supernormal net revenues are those above the normal cost of equity capital.

Adjusted Demand at Reference represents the demand payment at 100% plus any immaturity adjustment. Adjusted Demand at Reference was the key output of the model used in the previous Demand Curve reset (the "original model"). The original model assumes an annual payment and evaluates the annual capacity payment assuming an average level of excess capacity and a distribution around that level using the average annual payment. The original model, however, did not evaluate revenue after adjusting the demand curve to a summer level as NYISO does in practice and the model did not evaluate Summer and Winter Capability Periods expected clearing revenue based on seasonal aggregate capacity differences.

Changes

We revised the original model to account for differences in aggregate Summer and Winter locational capacity and the NYISO adjustment to the reference point. The first adjustment is that the Demand at Reference that we will provide NYISO from the model will be increased by NYISO before developing the Demand Curve. Hence, while the Demand Curve is the same in each of the two Capability Periods, it is developed by NYISO taking the annual number and adjusting for the Summer/Winter clearing effect. Second, we simulate separately expected clearing revenue in the Summer and Winter Capability Periods. The Summer simulation assumes the input level of excess capacity and standard deviation. To determine the demand revenue in the Winter, two adjustments are made. First, the demand revenue per kW is lower because there is more capacity and the market clears further down the Demand Curve toward the zero intercept. The ratio of Winter to Summer capacity used was that provided by the NYISO as the "Ratio of Winter to Summer DMNCs" for 2008-2009. This adjustment increases the level of excess capacity in the Winter. Second, because the proxy unit produces more capacity during the Winter, generators receive payments for more kW in the Winter than in the Summer. This fact partially offsets the effects of the first adjustment. The model sets Winter capacity for the proxy unit to be greater than Summer capacity by a ratio equal to the ratio of the Summer DMNC to the Winter DMNC.

The net effect of these two adjustments is to make Winter demand payments lower than those in the summer by 30-60%. Summer payments are higher and Winter payments are lower than payments in corresponding scenarios without the seasonal adjustment.

To calculate the Adjusted Demand at Reference (ADR) in scenarios with the seasonal factors, we used a relationship embedded in the spreadsheet provided by NYISO.

$$ADR = \frac{12}{MS} * RefDemand_{summer} \frac{DMNC_{summer} + DMNC_{winter} * \left(1 - \frac{\text{Ratio of DMNCs} - 1}{\text{x-intercept} - 1}\right)}{2 * DMNC_{90}}$$

Where:

MS is the number of summer months in a year (6);

x-intercept is the capacity level at which the demand curve equals $0 (e.g., 112%);

$RefDemand_{Summer}$ is the sum of summer demand payments accrued over a year; this is calculated by the model;

The DMNC values describe the output of a given unit in a given region (e.g., Frame 7 in the Capital Region).

In those cases in which there is no seasonal adjustment, the ADR ($/kW-year) equals the reference demand ($/kW-month) times 12.

Manipulating the Model

The overall architecture of the spreadsheet has been preserved. The “Model” sheet is the core. The following parameters have been added to describe the difference between summer and winter:

Months of Summer

Winter:Summer E and AS Profits Ratio

DMNCsummer (MW @ 90°)

DMNCwinter (MW@ Capital - 15.3°, NYC/LI - 28°)

$DMNC_{90}$ (MW)

Ratio of Winter to Summer DMNCs

Ratio of Winter to Summer D @ Reference

Winter:Summer E and AS Profits Ratio is set at 1 for all cases. The last five parameters are drawn automatically from a spreadsheet provided by NYISO (included in the model as the sheet "Current Curve").

In the blue calculation areas demand payments and energy and ancillary service payments have been split into two, one summer and one winter.

The "Results Summary" sheet has not been modified except to display these new calculations.

Status of the Model and Initial Results

The model version being provided is v102. It contains cases used to produce the final Demand Curves from the 2007 reset. It also contains the same cases with the revised seasonal methodology. The model will be updated for new inputs. However, the purpose of this release is to isolate the methodology enhancement and to avoid confusing that change with input changes. The results of these changes are below.

Adjusted Demand at Reference (This variable will be provided to NYISO, which will develop a curve using the summer value from its established formula)			
		2007 Reset	2007 Reset with 4% Reduction to ZCP
Capital	Flat	83.01	87.89
	Seasons	85.50	87.06
NYC	Flat	123.18	130.92
	Seasons	126.01	131.06
LI	Flat	76.99	81.25
	Seasons	71.11	74.05

The results generally do not appear to indicate material changes to the values developed from the model. This is likely the case as the NYISO formula already considers the aggregate level of excess and the unit Summer/Winter ratios in developing the Demand Curve. Additionally the model results appear to indicate that a steeper demand curve results in less of an adjustment when seasons are considered. At this point we do not have an intuitive explanation for why that is that the case, but we expect that it occurs because the NYISO formula is sensitive to the demand curve slope. For example using the capital region as an example, and assuming that NERA would report a value of 83.01 to NYISO on an annual basis, NYISO would develop a

Demand Curve with a reference point (i.e., summer point) of $ 8.19 per month with a 12% zero-crossing point and $ 9.58 with an 8% zero-crossing point.