Potential BOR Impacts of Reserve Requirement Increases

May 29, 2014

Purpose

- PJM was asked to provide an order of magnitude for the reductions in balancing operating reserves that would result from increasing the reserve requirements as proposed in the PJM Energy and Reserve Pricing solution package.
- Since simulations to estimate the anticipated reduction in balancing operating reserves could not be performed accurately, PJM has instead calculated the dollar figures for a range of reduction percentages.
- These values are not intended to predict that any particular percentage reduction will result from increases to the reserve requirements; instead, they are intended to quantify how large or small the total dollar impact could be.

Methodology

- PJM identified the set of days from this past summer and winter when the reserve requirements would have likely been increased, based on the days meeting both of the following criteria:
  - A hot or cold weather alert was in effect
  - Significant additional generation was scheduled to cover operational uncertainty
- The total balancing operating reserves for each day were identified and then broken into uplift and lost opportunity cost (LOC) buckets
- Potential reductions in balancing operating reserves were calculated for four scenarios, using assumptions of 5%, 10%, 20% and 50% reductions
  - Note, no expectations are implied by the selection of these reduction percentages
- For simplifying purposes, it was assumed that as uplift decreases LOC increases by the same percentage
  - This increase in LOC partially offsets the decrease in uplift

Definitions

The following terms are used in the chart that follows:

- **Uplift** – The make whole payments to resources following dispatch and operating at costs in excess of LMP, including units committed for reactive services and blackstart *(units raised up uneconomically)*
  - As LMPs and reserve prices increase in response to the reserve requirement increases, make whole payments will decrease because a larger portion of a resource's cost will be covered by LMP and reserve clearing prices.
- **LOC** – The profit forgone by resources following PJM's direction to produce at a lower output than what is indicated by the intersection of the resource's LMP and its offer curve *(units held down uneconomically).*
  - LOC is incurred by units manually dispatched to lower output for reliability reasons and CTs committed in the day-ahead market but not dispatched in real-time.
  - As LMPs increase in response to reserve requirement increases, resources held down uneconomically will forgo greater profits resulting in increased LOC payments.
- **Reduction** – The net reduction in balancing operating reserve assuming a given percentage reduction. This value is calculated as (Uplift * Reduction %) – (LOC * Reduction %).

Potential Winter 2014 Reductions

Date	Uplift	LOC	Reduction			
			5%	10%	20%	50%
1/7/2014	14.4 M	8.4 M	0.3 M	0.6 M	1.2 M	3.0 M
1/8/2014	29.9 M	2.6 M	1.4 M	2.7 M	5.5 M	13.7 M
1/22/2014	71.1 M	12.8 M	2.9 M	5.8 M	11.7 M	29.2 M
1/23/2014	55.9 M	12.9 M	2.1 M	4.3 M	8.6 M	21.5 M
1/24/2014	25.9 M	15.9 M	0.5 M	1.0 M	2.0 M	5.0 M
1/27/2014	45.4 M	0.1 M	2.3 M	4.5 M	9.1 M	22.7 M
1/28/2014	76.0 M	2.1 M	3.7 M	7.4 M	14.8 M	37.0 M
1/29/2014	24.0 M	1.5 M	1.1 M	2.2 M	4.5 M	11.2 M
Total	**342.7 M**	**56.4 M**	**14.3 M**	**28.6 M**	**57.3 M**	**143.2 M**
Average	**42.8 M**	**7.0 M**	**1.8 M**	**3.6 M**	**7.2 M**	**17.9 M**

Reduction values assume LOC increases by the same percentage Uplift decreases

Potential Summer 2013 Reductions

Based on the amount of additional generation scheduled to cover operational uncertainty for each of the hot weather alert days, PJM does not believe the reserve requirements would have been increased for any days during Summer 2013.