Area selection to apply shifting methodology

Draft

The purpose of this paper is to describe the impact of different shifting methodologies.

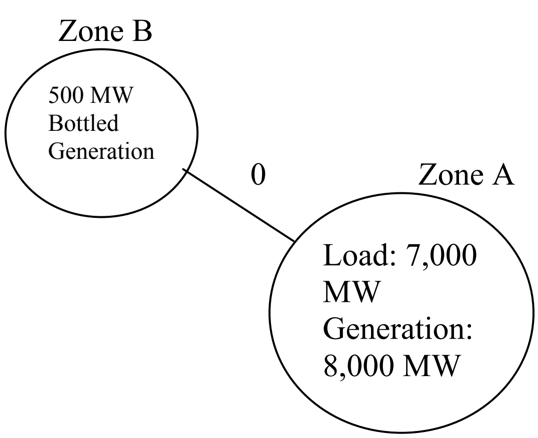
Policy 5 methodology calls for removing the excess capacity from capacity rich zones. This methodology removes basically all the fat that is not needed for reliability.

Policy 5, **Appendix A, 3.1:** Add or remove capacity from zones west of the Total East Interface that have excess capacity reserves (capacity rich zones), proportional to their existing excess capacity, until the statewide capacity to peak load ratio equals a desired IRM study point.

The following are a series of extreme examples for discussion:[1]

ASSUMPTIONS
Total load: 7,000 MW
Total Generation: 8,500 MW
Zone B bottled generation: 500 MW
Capacity required to meet LOLE criteria: 7800 MW of non-bottled capacity

1) *Current Policy 5 Example*
To represent bottle generation of 500 MW the line joining zone A and B is set to 0
LOLE = 0.09

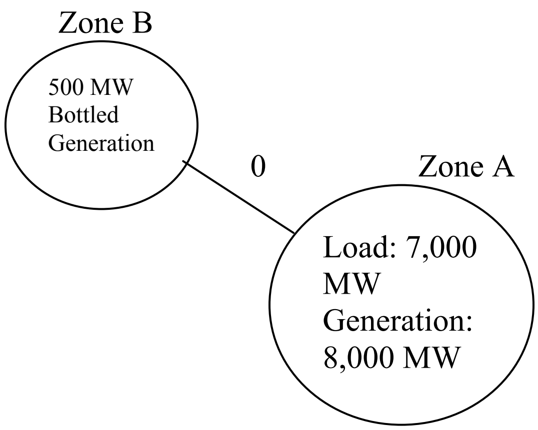


According to Policy 5, generation or a constrained transmission line should be removed first from the capacity rich zones, in this case Zone B. Because removing all the

[1] The examples assume that there is 500 MW of bottled generation that is grandfathered as deliverable in the capacity market. This extreme example is used to highlight the differences in methodology. While the NYISO has no areas where capacity is 100% bottled, there are areas where capacity has a higher likelihood of being curtailed due to transmission limits between the generators and the load centers.

generation in Zone B (500 MW) does not affect the LOLE, the LOLE remains at 0.09 after all Zone B generation has been removed. Policy 5 would then direct that capacity begin to be removed from Zone A until an LOLE of 0.1 is reached. This results in removing an additional 200 MW from Zone A and the conclusion that the minimum system reserve margin is equal to 111.4% (7800 MW/ 7000 MW). Therefore, pursuant to Policy 5, 7,800 MW of capacity in the two zones are sufficient to meet the system LOLE criteria.

2) Proportional Shifting Example

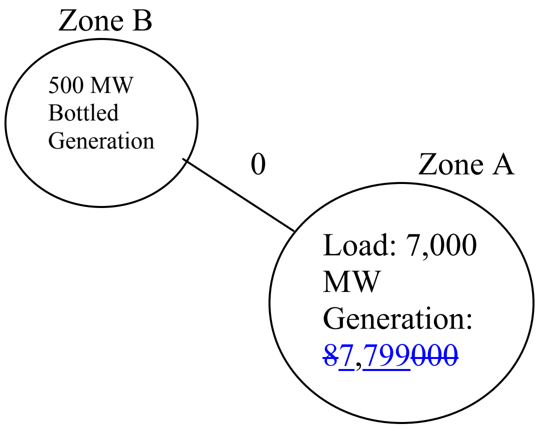


If we remove generation proportionally to the total generation available in each zone then, for each 100 MW of generation that is removed we will remove 94.12 MW from Zone A and 5.88 MW from Zone B. Once again, LOLE criteria is met when we have removed 200 MW from Zone A. Under the proportional methodology this results in also removing 12.5 MW from Zone B. In this case 8,287.5[2] MW of generation is required to meet the system LOLE requirement and the reserve margin is 118.4%.

3) ~~Alternate Capacity Assumptions~~Current Policy 5 and 201 MW retired in Zone A

However, problems begin to show when assumptions are changed slightly assuming capacity begins retiring in Zone A. As the capacity level in Zone A declines the calculated reserve margin under Policy 5 remains at 111.4% until the level of installed capacity in Zone A is reduced to less than 7800 MW.

[2] 7,800 MW from Zone A and 487.5 MW from Zone B.

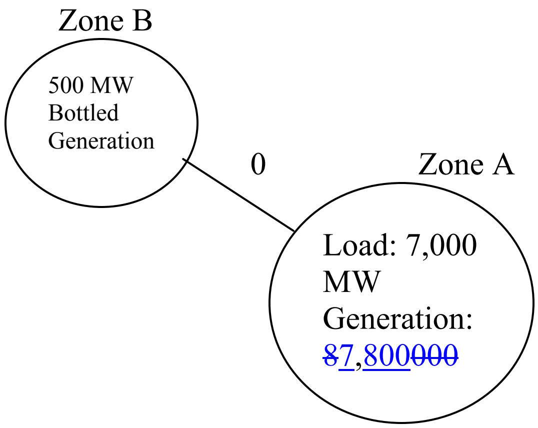


At this point, the system does not and can not meet the LOLE criteria and has an LOLE higher than 0.1. Generation in Zone B cannot contribute to the positively to improve the reliability to meet the LOLE criteria.

~~The differences in the two methodologies appear stark. Loads would presumably prefer to have the current methodology with its lower IRM. However, problems begin to show when assumptions are changed slightly assuming capacity begins retiring in Zone A. As the capacity level in Zone A declines the calculated reserve margin under Policy 5 remains at 111.4% until the level of installed capacity in Zone A is reduced to 7800 MW.~~ This is because until there is 7800 MW or less of capacity in Zone A, the Policy 5 shifting methodology will first remove all capacity from Zone B and then begin removing capacity from Zone A until it meets the LOLE criteria ~~(assumed above to require 7800 MW in Zone A)~~. ~~Once there is only 7,800 MW of capcity in Zone A at the start, the initial run just meets the LOLE criteria and there is no capacity shifting under Policy 5. The required capacity is calculated at the full 8300 MW of capacity available in both zones and the reserve margin is set at 118.6%[3].~~ The Policy 5 methodology gives the signal that there is substantial excess capacity (700 MW in ~~the initial~~ example one) up until the point that it suddenly shifts the reserve margin to signal that the system requires a much higher level of capacity to maintain reliability.

4) Current Policy 5 and 200 MW retired in Zone A

[3] 8,300 MW of capacity divided by 7,000 MW of load.



Once there is only 7,800 MW of capcity in Zone A at the start, the initial run just meets the LOLE criteria and there is no capacity shifting under Policy 5. The required capacity is calculated at the full 8300 MW of capacity available in both zones and the reserve margin is set at 118.6%[4].

Under the proportional shifting methodology the IRM would also rise to 118.6% as the Zone A capacity level drops to 7800 MW. However, in this case the rise is only 0.2% from the 118.4% in the first example. Throughout, the reserve margin calculated under the proportional shifting methodology is signaling that there is a relatively small amount of excess reserves starting at 212.5 MW of excess capacity in the initial example and smoothly falling to zero excess after 200 MW retires from Zone A. Throughout the process, the reserve margin calculated under the proportional shifting methodology provides a more accurate estimate of the usable excess in the system.

Discussions
The differences in the two methodologies appear stark. The market would presumably prefer to have the current methodology example one that has a lower IRM and provides the least cost of capacity.

Market Implications
While the New York State Reliability Council and the Installed Capacity Subcommittee are not involved in market issues, the capacity market is the mechanism to assure that the NYISO meets its long term reliability target~~s over time~~. For this purpose, assume that the market is covered by the NYISO's statewide capacity market design (i.e. a demand curve that declines from the net cost of new entry at the minimum requirement to zero value of capacity 12 percent beyond the minimum requirement).

4 8,300 MW of capacity divided by 7,000 MW of load.

Under the Policy 5 methodology and the initial assumptions in example one, the market is 8.97% long.[5] The result is that the market clearing price is ¾ of the way down the demand curve and provides a capacity price that is ¼ the cost of new entry. As such, it places a relatively low value on capacity and could easily result in signaling existing units to retire or not additional transmission or generation investment required . Since the capacity market does not differentiate between capacity in the two zones, retirements are as likely in Zone A as they are in Zone B.– Once 199 MW has retired in Zone A the system is one MW away from just meeting its reliability criteria and two MW away from failing to meet its reliability criteria. However, under the policy 5 methodology the market would appear to be 6,42%[6] long and would provide a capacity price that is less than ½ of the net cost of new entry. The price signal is in no way consistent with precarious capacity situation.

Under the proportional shift methodology and the initial assumptions the market is 2.72% long.[7] The result is a market clearing price of 87.4% the net cost of new entry and consistent with the relative need for new entry. With 199 MW shut down in Zone A the result is that the market is 0.013% long, consistent with the condition that with one more MW loss in Zone A and the system will just meet its minimum reliability requirement.

[5] 8,500 MW of capacity divided by the 7,800 MW minimum level of capacity required by the reserve margin.

[6] 8,300 MW of capacity divided by the 7,800 MW minimum level of capacity required by the reserve margin.

[7] 8,500 MW of capacity divided by the 8,287.5 MW minimum level of capcity required by the reserve margin.