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NYCA LOLE Violations Cost Allocation

The Need to Modify the 6/3/2005 Proposed Resource Adequacy Cost Allocation

The cost allocation methodologies presented to ESPWG on June 3, 2005 (pertaining to a regulated solution to a resource adequacy violation) presumed that reliability needs would be stated in terms of LICAP deficiencies in Localities or in ICAP deficiencies for the NYCA.

In actuality, the resource adequacy reliability needs in the latest approved Reliability Needs Assessment (RNA) were stated in terms of the NYCA LOLE exceeding 0.1 along with associated the LOLEs for each Zone. Consequently, the original cost allocation methodologies proposed for resource adequacy reliability violations lack the information needed. Therefore, the three methods below, each of which can be computed using information and/or methods from the RNA, are proposed as potential alternatives that could replace both the LICAP and the ICAP Deficiency sections in the June 3 proposal:

Potential Cost Allocation Methods for NYCA LOLE Deficiencies

Method A: All loads in NYCA cost allocated on a load ratio share
Method B: Loads in Rest-of-State (ROS)[1], Zone J or Zone K with the highest LOLE are allocated all of the cost
Method C. Loads in ROS, Zone J and Zone K pay on a proportional basis based upon their individual impacts on LOLE

Each of these methods is explored in more detail below using examples based upon the following common assumptions:

Common Assumption for All Methods Representative Values for Illustrative Purposes - Not Necessarily Actual				
	ROS	**Zone J**	**Zone K**	**Total NYCA**
Coincident Peak Load (MW)	16,000	12,000	6,000	34,000
LOLE	0.070	0.110	0.060	0.200
If NYCA LOLE is greater than 0.100, a Reliability Violation Occurs				

[1] Rest-of-State (ROS) consists of all of the New York Control Area (NYCA) excluding New York City (Zone J) and Long Island (Zone K).

Method A: All loads in NYCA cost allocated on a load ratio share

For LOLE (Loss-of-Load-Expectation) violations in NYCA, costs for a regulated solution would be allocated to all loads on a load ratio share. See Table A for example...

Table A
Method A: All loads in NYCA cost allocated on a load ratio share
LOLE Violation Cost Allocation Example

	ROS	**Zone J**	**Zone K**	**Total NYCA**
Coincident Peak Load (MW)	16,000	12,000	6,000	34,000
LOLE	0.070	0.110	0.060	0.200
Cost Allocation (as % of Total)	47.1%	35.3%	17.6%	100.0%

For Method A, all LSEs in the NYCA would be cost allocated for the regulated solution on a load ratio share (of coincident peak load) at the same rate for all sub-zones.

Method B: Loads in ROS, Zone J or Zone K with the highest LOLE are allocated all of the cost

For LOLE violations in NYCA, costs for a regulated solution would be allocated to all loads in *either* ROS, Zone J or Zone K depending upon which exhibited the highest LOLE.   See Table B for example …

Table B

Method B: Loads in ROS, Zone J or Zone K with the highest LOLE are allocated all of the cost

LOLE Violation Cost Allocation Example

	ROS	**Zone J**	**Zone K**	**Total NYCA**
Coincident Peak Load (MW)	16,000	12,000	6,000	34,000
LOLE	0.070	0.110	0.060	0.200
Cost Allocation (as % of Total)	0.0%	100.0%	0.0%	100.0%

For Method B, because Zone J has the highest LOLE and the NYCA LOLE is greater than 0.1, all LSEs in Zone J would be cost allocated on a load ratio share (of coincident peak load) for the regulated solution; no other LSEs would be cost allocated for the solution.

Method C. Loads in ROS, J and K pay on a proportional basis based upon their individual impacts on LOLE

For LOLE violations in NYCA, costs for a regulated solution would be allocated on an impact basis to account for both load share and the location of the load (similar to using a Generator Shift Factor) to ROS, Zone J and/or Zone K containing load that, if reduced uniformly across the area or zone (on MW basis[2]), would contribute to alleviation of the LOLE violation that caused the need for the regulated solution (as determined with uniform load decreases using the same software/ procedures that initially identified the LOLE violation). This method presumes a uniform percentage load reduction takes place across the NYCA to alleviate the LOLE violation.

Example … An LOLE criteria violation is identified in which load reductions in ROS, Zone J and Zone K would each reduce the reliability violation (i.e., improve reliability so the NYCA LOLE is less than 0.1). See Table C.

Studies indicate (due to relative magnitudes and locations) that, *independently*, either a 60% ROS load reduction, a 10% Zone J load reduction, or a 40% Zone K load reduction is shown to reduce the NYCA LOLE to less than 0.1. Thus, in terms of impact, a comparable load reduction in Zone J has the greatest effect on alleviating the LOLE violation. In other words, the impact of a 1 MW Zone J load reduction is equivalent to the impact of a 2 MW Zone K load reduction, which in turn is also equivalent to the impact an 8 MW ROS load reduction.

The uniform percentage load reduction across the NYCA that alleviates the LOLE violation can be computed based upon the above information; i.e.: (a) relative coincident peak loads (16,000 MW, 12,000 MW and 6,000 MW for ROS, Zone J and Zone K respectively); (b) MW reduction equivalents to the impact of 1 MW load reduction in Zone J (8 MW, 1 MW and 2 MW for ROS, Zone J and Zone K respectively); and (c) the load reduction that would be needed solely in Zone J to alleviate the LOLE violation.

This uniform load reduction computes as 7.06% across the NYCA which equates to 1,129 MW, 847 MW and 424 MW in ROS, Zone J and Zone K respectively. In equivalent impact, the 1,129 MW load reduction in ROS equates to a 141 MW load reduction in Zone J (1,129 MW / 8 MW); similarly the 424 MW load reduction in Zone K equates to a 212 MW load reduction in Zone J (424 MW / 2 MW).

If a uniform load reduction across NYCA were to be made equivalent to the sole 1,200 MW load reduction in Zone J that would alleviate the LOLE violation, ROS,

[2] Possibility on a MVA basis in the future to take load power factor impact on transfer limits into account in an iterative process.

Zone J and Zone K would contribute an equivalent 141 MW, 847 MW and 212 MW respectively. This equates to 11.8%, 70.6% and 17.6% respectively contributed. To state this another way, for a uniform percentage load reduction across the NYCA: ROS, Zone J and Zone K respectively contribute 11.8%, 70.6% and 17.6% to alleviating the violation - and by extension – respectively also contribute to the cause of the violation.

Hence, cost allocation for the regulated solution to alleviate the LOLE violation would be assigned to the ROS, Zone J and Zone K in the proportion of 11.8%, 70.6% and 17.6% respectively.

Table C

Method C. Loads in ROS, J and K pay on a proportional basis based upon their individual impacts on LOLE

LOLE Violation Cost Allocation Example
Representative Values for Illustrative Purposes - Not Necessarily Actual

	ROS	**Zone J**	**Zone K**	**Total NYCA**
Coincident Peak Load (MW)	16,000	12,000	6,000	34,000
LOLE	0.070	0.110	0.060	0.200
% Load Reduction Needed Alone	60.0%	10.0%	40.0%	--
MW Load Reduction Needed Alone	9,600	1,200	2,400	--
MW Load Reduction Equivalent to the Impact of 1 MW Reduction in Zone J	8	1	2	--
% Load Reduction Needed if Shared	7.06%	7.06%	7.06%	7.06%
MW Load Reduction Needed if Shared	1,129	847	424	2,400
MW Load Reduction on an Equivalent Zone J Load Reduction Impact Basis	141	847	212	1,200
Cost Allocation by ICAP Area for a Regulated Solution	11.8%	70.6%	17.6%	100.0%

"% Load Reduction Needed Alone" is uniform load decrease solely in ROS, Zone J or Zone K that is sufficient to reduce NYCA LOLE to less than 0.1.

Based on above, in terms of decreasing LOLE, an 8 MW reduction in ROS equals a 1 MW reduction in Zone J which equals a 2 MW reduction in Zone K

Total % load reduction needed is determined by first solving for Y where:

(16,000 x Y / 8) + (12,000 x Y) + (6000 x Y / 2) = 1200; thus 17000 x Y = 1200; thus Y = 1200/17000 = 7.06%

Method C This method combines two cost allocation concepts:

a) If LOLE impact is the same (i.e., a 1 MW load reduction in two different ICAP areas[3] has the same impact on improving LOLE), the zone with the larger composite coincident peak load would be cost allocated proportionally more for a regulated solution (thus, the "rate" allocated to each zone would be the same).

b) An ICAP Area that has a greater LOLE impact (i.e., a 1 MW load reduction in one ICAP area has a larger impact on improving LOLE than a one MW load reduction in other ICAP Areas), it would be cost allocated proportionately more for a regulated solution.

While more complex, Method C appears to successfully meet Cost Allocation Principles set forth in the NYISO CRPP Tariff; particularly under Items "c" and "d" of Section 10.2 of that Tariff: i.e.:

"c. Primary beneficiaries shall initially be those Transmission Districts identified as contributing to the reliability violation.
d. The cost allocation among primary beneficiaries shall be based upon their relative contribution to the need for the regulated solution."

[3] An ICAP Area would be Rest-of-State (ROS), Zone J or Zone K.

ICAP Reserve Sharing in MARS and Its Impact on LOLE Computations[4]

Within a MARS analysis that calculates zonal Loss-of-Load-Expectations (LOLEs) as well as overall NYCA LOLE, the technique of “reserve sharing” provides that local available generation in each zone serves that zone’s load first, and then any excess generation is made available to serve load in other “more remote” zones. Thus, even in the absence of inter-zonal capacity binding transmission constraints, LOLEs for each zone could differ because the ratio of local generation to local load may vary.

Consequently, except for the protocol that has generation serving nearby load first and then serving load that is farther away, all zones in ROS = Rest-of-State (again without capacity binding transmission constraints would have the same LOLE. In contrast, the MARS computed LOLE for each Locality (which each have capacity import restrictions due to transmission constraints) would be more representative of that specific Locality’s LOLE.

Zones in ROS presumably are not anticipated to have capacity binding transmission constraints between them. Therefore, a load decrease or comparable generation addition anywhere in ROS should have the same impact on ROS LOLE and NYCA LOLE[5] from a MARS computational perspective. In other words, if ROS loads are contributing to NYCA LOLE, then all loads anywhere in the ROS have the same impact on that contribution to that LOLE, and on the cause for a resulting NYCA LOLE violation. Additionally, a transmission capacity addition between two zones under these circumstances should not have a material impact on LOLE based upon the way LOLE is computed.

Alternately, all load decreases or comparable generation additions anywhere within an import restricted Locality (absent internal load generation pockets) should have the same impact on LOLE for that Locality and the NYCA regardless of where they are located within that Locality. But this LOLE impact would likely be different compared to a load decrease or generation addition outside that Locality. Additionally, a transmission capacity addition from the outside into he Locality should improve the LOLE of both the Locality and the NYCA overall.

Based upon the above relationships, the cost allocation for a NYCA LOLE violation regulated solution should be the same for all loads within ROS or within a specific Locality (because causation within each is essentially the same); but will likely not be the same proportion for the ROS and all Localities (because causation among them differs).

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[4] Needs to be verified by NYISO Staff.
[5] Taking into account that a large enough load decrease and/or generation addition could produce an inter-zonal capacity binding transmission constraint that heretofore had not been exhibited.