

Request to Develop or Modify Reliability Rules and Requirements (NYSRC Policy No. 1-11)

Submit request to herb@poweradvisorsllc.com via the NYSRC site www.nysrc.org

Item	Information
1. PRR No. & Title of Reliability Rule or Requirement change	PRR 149: Clarify the Interpretation of the LOLE Reliability Risk Metric in the NYSRC Resource Adequacy Criterion and the Application of Multiple Reliability Risk Metrics in IRM and Resource Adequacy Assessments
2. Rule Change Requester Information	
Name	RRS
Organization	
3. New rule or revision to existing rule?	Revisions to existing rule. A.1: Establishing NYCA Installed Reserve Margin Requirements
4. Need for rule change, including advantages and disadvantages	<p>This rule change has two components: (1) To express the NYSRC’s LOLE criterion’s quantification of resource adequacy in terms of “loss of load event-days per year” instead of “days per year,” in order to avoid a possible misinterpretation that the NYSRC’s LOLE criterion allows a loss of load duration of 2.4 hours per year, and (2) to require IRM and resource adequacy assessments to include multiple reliability risk metrics in order to more fully describe loss of load events.</p> <p>The proposed LOLE criterion change is consistent with recommendations in the IEEE Resource Adequacy WG’s paper, <i>Clarifying the Interpretation and Use of the LOLE Resource Adequacy Metric</i>, presented at NERC’s Probabilistic Analysis Forum on October 5, 2021. This change would not affect in any way present ICS and NYISO procedures and models for IRM and resource adequacy assessments -- it brings the resource adequacy criterion in line with present study applications and criterion interpretations. An Appendix provides historical background information concerning the need for this rule change.</p>
5. Related NYSRC rules	Reliability Rules A2 and A3
6. Section A – Reliability Rule Elements	
1. Reliability Rule	An Installed Reserve Margin Requirement for the NYCA for each Capability Year shall be established.
2. Associated NERC Standards & NPCC Standards and Criteria	NPCC: Directory 1 NERC: None
3. Applicability	NYSRC Installed Capacity Subcommittee and NYISO
7. Section B Requirements	R1. All probabilistic resource capacity requirement analyzes conducted by the NYSRC and NYISO, including resource adequacy evaluations and the establishment of the NYCA Installed Reserve Margin (IRM) requirement, shall meet the NYSRC Resource Adequacy Criterion in R1.1.

	<p>R1.1 NYSRC Resource Adequacy Criterion</p> <p>The <i>Loss of Load Expectation (LOLE)</i> of disconnecting firm load due to resource deficiencies shall be, on average, no more than 0.1 loss of load <i>Event-Days</i> per year. LOLE evaluations shall make due allowance for demand uncertainty, scheduled outages and deratings, forced outages and deratings, assistance over interconnections with neighboring control areas, NYS Transmission System emergency transfer capability, capacity and/or load relief from available operating procedures.</p> <p>R2. In addition to calculating the LOLE reliability metric in accordance with R1, the NYSRC and NYISO shall include calculation and reporting of <i>Loss of Load Hours (LOLH)</i> and <i>Expected Unserved Energy (EUE)</i> reliability metrics in all probabilistic resource capacity assessments and studies.</p> <p>R3. The NYSRC shall annually perform and document an analysis to calculate the NYCA <i>Installed Reserve Margin (IRM)</i> requirement for the following <i>Capability Year</i>. The IRM analysis shall:</p> <p>R3.1 Probabilistically establish the IRM requirement for the NYCA in accordance with the NYSRC Resource Adequacy Criterion in R1.1.</p> <p>R3.2 Utilize the methodology and modeling parameters for establishing NYCA IRM requirements and a timeline for the study process, as described in NYSRC Policy 5, "Procedure for Establishing NYCA Installed Capacity Requirements."</p> <p>R3.3 Probabilistically calculate LOLH and EUE metrics for the NYCA in accordance with R2.</p> <p>R3.4 Prepare a technical report documenting the assumptions, models, methodology and results of the IRM Study in accordance with R3.1, R3.2 and R3.3.</p>
<p>8. Section C – Compliance Elements</p>	
<p>1. Measures</p>	<p>M1. The NYSRC Installed Capacity Subcommittee conducted the annual NYCA IRM study for the following <i>Capability Year</i>, in accordance with R1, R2, R3.1, and R3.2 and prepared a technical report in accordance with R3.4.</p>

2. Levels of Non-Compliance	<p>Level 1: An NYSRC or NYISO resource capacity assessment or analysis did not report the LOLH and/or EUE metrics in accordance with R2 requirements.</p> <p>Level 2: An IRM report was submitted that complied with R1, R3.1, R3.2, and R3.3 requirements, but was incomplete in one or more areas.</p> <p>Level 3: Not applicable.</p> <p>Level 4: An IRM report was not submitted.</p>
3. Compliance Monitoring Process (See Policy 4):	No change.
3.1 Compliance Monitoring Responsibility	No change.
3.2 Reporting Frequency	No change
3.3 Compliance Reporting Requirements	No change
9. Implementation Plan	This rule change will be implemented immediately following EC approval of PRR 149.
10. Comments	<p>1. New Glossary terms:</p> <ul style="list-style-type: none"> • Loss of Load Expectation (LOLE): The expected number of loss of load Event-Days per year • Loss of Load Hours (LOLH): The expected number of loss of load Event-Hours per year • Expected Unserved Energy (EUE): The expected number of MW-Hours of unserved load per year • Event-Day: An event-period lasting one day during which at least one Event-Hour occurs. • Event-Hour: An event-period lasting one hour during which, at some point¹, system resources are insufficient to meet demand. <p>(1) The resolution of probabilistic resource adequacy analyses is currently limited to a minimum of one hour, so any event in that hour is assumed to last a full hour.</p> <p>2. Calculation of Reliability Indices</p> <p>The LOLE criterion modification in this PRR shall not change the present LOLE calculation procedure. Loss of Load Expectation (LOLE) is generally defined as the expected (weighted average) number of days in a given time period (e.g., one study year) when at least one hour from that day, the hourly demand (for each of the seven load bins and per replication) is projected to exceed the zonal resources capacity (event-day) in any of the seven load bins. Within a day, if the zonal demand exceeds the resources in at least one hour of that day (could be anywhere from hour 1 to 24, consecutive or not), this is counted as one event-day for the respective load bin and replication. LOLE studies currently simulate 2,000 replications per study year and load level (seven load bins), for a total of 14,000 replications per study year. Weighted average is based on load bin probability, total bin event-days, and total number of replications.</p>
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11. Date Rule Adopted	

12. PRR Revision Dates	Initial draft 11/12/21, 11/30/21, 1/25/22, 1/27/22, 2/4/22, 2/15/22, 2/25/22, 3-3-22, 3-4-22
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APPENDIX

HISTORICAL BACKGROUND CONCERNING THE NEED TO REVISE THE NYSRC RESOURCE ADEQUACY CRITERION

- The adoption of the 1 day in 10 years metric as an acceptable level of risk in North America began during the 1960s.
- In the late 1960s the New York Power Pool and its members also adopted this criterion.
- Probabilistic models at that time, because of program limitations, represented only 260 daily peaks per year in LOLE studies, each peak hour representing one weekday.
- Therefore, at that time ,the daily weekday peaks correctly represented the total number of days per year.
- More recently, improved computer capabilities have allowed the modeling of 8760 hours per year, i.e., 24 hours per day. Some systems have interpreted the 1 day in 10 years criterion as “24 hours in 10 years” or “2.4 hours per year” based on the premise that the original criterion referred to a full day’s duration of shortfall.
- Instead, the NYPP, and now the NYSRC, interprets the LOLE criterion as a counting measure, i.e., the expected number or frequency of loss of load events per year or per 10 years. Therefore, the NYSRC does not interpret the LOLE as equivalent to 2.4 days/year loss of load.
- Accordingly, to avoid misinterpretation, RRS proposes that “days per year” be replaced by “loss of load events per year” in the NYSRC resource adequacy criterion. This change is consistent with recommendations by the IEEE Resource Adequacy Working Group in its paper, *Clarifying the Interpretation and Use of the LOLE Resource Adequacy Metric*, presented at the 2021 NERC Probabilistic Analysis Forum on October 5, 2021.

RRS concludes that the proposed criterion change is consistent with or more stringent than the present NPCC resource adequacy criterion.

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5. Related NYSRC rules	Reliability Rules A2 and A3
6. Section A – Reliability Rule Elements	
1. Reliability Rule	An Installed Reserve Margin Requirement for the NYCA for each Capability Year shall be established.
2. Associated NERC Standards & NPCC Standards and Criteria	NPCC: Directory 1 NERC: None
3. Applicability	NYSRC Installed Capacity Subcommittee and NYISO
7. Section B Requirements	<p>R1. All probabilistic resource capacity requirement analyzes conducted by the NYSRC and NYISO, including resource adequacy evaluations and the establishment of the NYCA Installed Reserve Margin (IRM) requirement, shall meet the NYSRC Resource Adequacy Criterion in R1.1.</p>

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	<p>R1.1 NYSRC Resource Adequacy Criterion</p> <p>The Loss of Load Expectation (LOLE) of disconnecting firm load due to resource deficiencies shall be, on average, no more than 0.1 loss of load events per year-Event-Days per year. LOLE evaluations shall make due allowance for demand uncertainty, scheduled outages and deratings, forced outages and deratings, assistance over interconnections with neighboring control areas, NYS Transmission System emergency transfer capability, capacity and/or load relief from available operating procedures, and when NYCA demand exceeds NYCA resource capacity at least one hour within the day.</p> <p>R1.2 To describe the magnitude, frequency, and duration of load shortfall events, NYSRC and NYISO probabilistic resource capacity assessments and analyses, in addition to calculating the LOLE shortfall risk metric, shall calculate and report the loss of load hours (LOLH) and the expected unserved energy (EUE) shortfall risk metrics.</p> <p>R2. In addition to calculating the LOLE reliability metric in accordance with R1, the NYSRC and NYISO shall include calculation and reporting of Loss of Load Hours (LOLH) and Expected Unserved Energy (EUE) reliability metrics in all probabilistic resource capacity assessments and studies.</p> <p>R3.2 -The NYSRC shall annually perform and document an analysis to calculate the NYCA Installed Reserve Margin (IRM) requirement for the following Capability Year. The IRM analysis shall:</p> <p>R3.2.1 Probabilistically establish the IRM requirement for the NYCA in accordance with the NYSRC Resource Adequacy Criterion in R1.1.</p> <p>R3.2.2 Utilize the methodology and modeling parameters for establishing NYCA IRM requirements and a timeline for the study process, as described in NYSRC Policy 5, "Procedure for Establishing NYCA Installed Capacity Requirements."</p> <p>R3.3 Probabilistically calculate LOLH and EUE metrics for the NYCA in accordance with R2.</p> <p>R3.2.43 Prepare a technical report documenting the assumptions, models, methodology and results of the IRM Study <u>in accordance with R3.1, R3.2 and R3.3.</u></p>
<p>8. Section C – Compliance Elements</p> <p>1. Measures</p>	<p>M1.-</p>

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	The NYSRC Installed Capacity Subcommittee conducted the annual NYCA IRM study for the following <i>Capability Year</i> , in accordance with R1, R2, R3.1, and R3.2 R2.1, R3.2 and and R3.2.2 ; and prepared a technical report in accordance with R3.4.2.3 . In addition, all NYSRC and NYISO probabilistic resource capacity assessments and analyzes included and reported the loss of load hours (LOLH) and the expected unserved energy (EUE) shortfall risk metrics as required by R1.2.
2. Levels of Non-Compliance	Level 1: An NYSRC or NYISO resource capacity assessment or analysis did not report the LOLH and/or EUE metrics in accordance with R2.4.2 requirements. Level 2: An IRM report was submitted that complied with R1, R3.1, R3.2, and R3.3 requirements , but was incomplete in one or more areas. Level 3: Not applicable. Level 4: An IRM report was not submitted.
3. Compliance Monitoring Process (See Policy 4):	No change.
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11. Date Rule Adopted	
12. PRR Revision Dates	<p>Initial draft 11/12/21, 11/30/21, 1/25/22, 1/27/22, <u>2/4/22, 2/15/22, 2/25/22, 3-3-22, 3-4-22</u></p>

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