

### **Definitions of Terms Used in Standard**

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the NERC Reliability Standards Glossary of Terms or the MRO Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Midwest Reliability Organization (MRO) Glossary. NERC and MRO defined terms are capitalized in the standard.*

**Resource Adequacy**<sup>1</sup> is defined as the ability of supply-side and demand-side resources to meet the aggregate electrical demand and energy requirements of the end-use customers with a specified degree of reliability.

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<sup>1</sup> Historically, the Resource Adequacy requirement was referred to as the planning reserve margin in MAIN Guide #6 and the Reserve Capacity Obligation (RCO) in the MAPP Generation Reserve Sharing Pool Handbook.

**A. Introduction**

1. **Title:** Planned Resource Adequacy Assessment<sup>2</sup>
2. **Number:** RES-501-MRO-02
3. **Purpose:** To establish common criteria by which to assess Resource Adequacy in the MRO for the 10 year planning horizon.
4. **Applicability**
  - 4.1. Load Serving Entity (LSE) or its delegated Planning Coordinator
5. **Effective Date:** 1<sup>st</sup> day of the 1<sup>st</sup> ~~month~~quarter one year following all appropriate Regulatory Authority Approvals, financial sanctions will become effective.

**B. Requirements**

**R1.**

~~R1.~~ The Each LSE or its delegated Planning Coordinator shall perform and possess the documentation of a planned Resource Adequacy assessment. *[Violation Risk Factor: Medium] [Time Horizon: Long Term Planning]*

To be valid, the Resource Adequacy assessment shall *[Violation Risk Factor: Medium] [Time Horizon: Long-Term Planning]*:

**R1.1** Be performed annually unless a document summarizing a review of system data that concludes that a lack of significant changes to system data used in the assessment do not warrant such a study is prepared~~provided to the MRO~~. A study is warranted if changes have occurred that require revisions in any key assumptions such as generation mix and transmission limitations that are not covered by a sensitivity study. The planned Resource Adequacy assessment is to be conducted for ~~Y~~year ~~0~~one through ~~Y~~year ~~T~~ten. Year ~~0~~one is defined as the year that begins with the upcoming annual peak season.

**R1.2** Be performed to meet an LOLP of no greater than 0.1 day in one (1) year which equals the sum of the LOLE for the integrated daily peak hours for each year. This shall be done for a minimum of 3 periods within the ~~Y~~year ~~0~~one through ~~Y~~year ~~T~~ten (as defined in R1.1) to ensure meeting one (1) day in ten (10) years. These periods are ~~Y~~year ~~0~~one, a minimum of one year in years 2 through 5, and a minimum of one year in years 6 through 10. Analysis shall:

**R1.2.1** Use loads developed from the expected 50:50 probability load forecast,

<sup>2</sup> In accordance with the Energy Policy Act of 2005, this standard does not authorize the MRO, ERO or FERC to order the construction of additional generation or transmission capacity or to set and enforce compliance with standards for adequacy or safety of electric facilities or services. Nothing in this standard shall be construed to preempt any authority of any State/Province to take action to ensure the safety, adequacy, and reliability of electric service within that State, as long as such action is not inconsistent with any reliability standard, as long as such action does not result in lesser reliability outside the State/Province than that provided by the reliability standards.

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**R1.2.2** Include load forecast uncertainty such as uncertainty due to load diversity, seasonal load variation, load variability due to other region economic forecasts or other factors.

**R1.2.3** Include transmission limitations that prevent delivery of generation reserves.

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~~R1.2.3~~**R1.2.4** Be performed for every day of each year throughout the period in R1.1.

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Expected Unserved Energy may be performed as the method to meet R1.2 provided the results of such an assessment is compared with an LOLP analysis and the comparison is documented.

**R1.3** Include, at a minimum, documentation of how and why the following were/were not included in the analysis:

**R1.3.1** Resource availabilities

**R1.3.1.1** Historic resource performance and any projected changes

**R1.3.1.2** Seasonal resource ratings

**R1.3.1.3** Modeling assumptions of non-conventional resources such as wind and cogeneration

**R1.3.1.4** Energy limitations of hydroelectric units.

**R1.3.1.5** Merchant plant availabilities

**R1.3.1.6** Modeling assumptions of firm capacity purchases from and sales to entities outside the Planning Coordinator area

**R1.3.1.7** Availability and deliverability of fuel

**R1.3.1.8** Common mode outages that **ea**ffect resource adequacy

**R1.3.1.9** Other environmental or regulatory restrictions of resource availability

**R1.3.1.10** Available Demand-Side Management

**R1.3.1.11** Resource maintenance outage schedules

**R1.3.1.12** Sensitivity to resource outage rates and resource capabilities

**R1.3.1.13** Consider impacts of extreme weather/drought conditions

**R1.3.2** Load Characteristics

**R1.3.2.1** Load forecasts

**R1.3.2.2** Load forecast uncertainty

**R1.3.2.3** Load diversity



MRO at least 90 days prior to the proposed change or 180 days prior to the planning period under review, whichever is greater. The LSE shall provide the MRO with evidence of acceptance of the delegation by the applicable party. All delegations are subject to verification by the MRO. [Violation Risk Factor: Lower], [Time Horizon: Operations Planning]

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**C. Measures**

- M1.** The LSE or its delegated Planning Coordinator shall have evidence of a valid planned Resource Adequacy assessment covering the 10 year planning horizon per Requirement R1.
- M2.** The LSE or its delegated Planning Coordinator shall have evidence that it performed an annual assessment of its Resource Adequacy for ~~Y~~year ~~One~~, a minimum of one year in years 2 through 5, and a minimum of one year in years 6 through 10 per Requirement R2.
- M3.** ~~The LSE and/or its delegate(s) shall have evidence that it has reported to the MRO completed all the reports as required in Requirement R3.~~

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**D. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Monitoring Responsibility:**

ERO delegated to Midwest Reliability Organization.

**1.2. Compliance Monitoring Period and Reset Timeframe.**

Annually.

**1.3. Annual Data Retention Period.**

The LSE or its delegated Planning Coordinator shall each retain the data necessary to conduct the analysis and documentation of the latest results from such analysis along with evidence of plan implementation for five (5) years. In addition, entities found non-compliant shall keep information related to non-compliance until found compliant.

The Compliance Monitor shall keep the last audit and all subsequent compliance records.

**1.4. Additional Compliance Information.**

None specified

**2. Violation Severity Levels**

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
<p><b>R1</b></p>	<p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to consider 1 or 2 of the Resource availability characteristics subcomponents under R1.3.1 and documentation of how and why they were included in the analysis or why they were not included</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to consider Transmission limitations and document how and why they were included in the analysis or why they were not included per R1.3.3</p>	<p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to express the planning reserve margin developed from R1.2 as a percentage of the <del>net-50:50</del> <a href="#">probability forecast peak load</a> <del>Median forecast peak Load</del> per R1.4</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to include 1 of the Resource Availability subcomponents under R1.3.1 and documentation of its use</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to include 1 of the Load forecast Characteristics subcomponents under R1.3.2 and documentation of its use</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a></p>	<p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to be performed or verified separately for individual years of <del>Y</del>year <del>One</del> through <del>Y</del>year <del>Ten</del> per R1.1</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator failed to perform an analysis or verification for one year in the 2 through 5 year period or one year in the 6 through 10 year period or both per R1.2</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to include 2 or more of the Resource Availability subcomponents under R1.3.1 and documentation of their use</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a></p>	<p>The <a href="#">LSE or its delegated</a> Planning Coordinator failed to perform and document a Resource Adequacy analysis annually per R1.</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator Resource Adequacy analysis failed to calculate a Planning reserve margin that will result in the sum of the probabilities for loss of Load for the integrated peak hour for all days of each planning year analyzed for each planning period being no greater than 0.1 per R1.2</p> <p><b>OR</b></p> <p>The <a href="#">LSE or its delegated</a> Planning Coordinator failed to perform an analysis for Year One per R1.2</p>

		<p>Planning Coordinator Resource Adequacy analysis failed to document that all Load in the <u>LSE or its delegated</u> Planning Coordinator area is appropriately accounted for in its Resource Adequacy analysis per R1.6</p>	<p>Planning Coordinator Resource Adequacy analysis failed to include 2 or more of the Load forecast Characteristics subcomponents under R1.3.2 and documentation of their use</p> <p><b>OR</b></p> <p>The <u>LSE or its delegated</u> Planning Coordinator Resource Adequacy analysis failed to include Transmission limitations and documentation of its use per R1.3.3</p> <p><b>OR</b></p> <p>The <u>LSE or its delegated</u> Planning Coordinator Resource Adequacy analysis failed to include assistance from other interconnected systems and documentation of its use per R1.3.5</p> <p><b>OR</b></p> <p>The <u>LSE or its delegated</u> Planning Coordinator Resource Adequacy analysis failed to consider 3 or more Resource availability characteristics</p>	
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			<p>subcomponents under R1.3.1 and documentation of how and why they were included in the analysis or why they were not included</p> <p><b>OR</b></p> <p>The <u>LSE or its delegated</u> Planning Coordinator Resource Adequacy analysis failed to document that capacity resources are appropriately accounted for in its Resource Adequacy analysis per R1.5</p>	
<p><b>R2</b></p> <p><u>Need to R3 to table.</u></p>	<p>The <u>LSE or its delegated</u> Planning Coordinator failed to document the projected Load and resource capability, for each area or Transmission constrained sub-area identified in the Resource Adequacy analysis for one of the years in the 6 through 10 year period per R1.2.</p>	<p>The <u>LSE or its delegated</u> Planning Coordinator failed to document the projected Load and resource capability, for each area or Transmission constrained sub-area identified in the Resource Adequacy analysis for one of the years in the 2 through 5 year period per R1.2.</p>	<p>The <u>LSE or its delegated</u> Planning Coordinator failed to document the projected Load and resource capability, for each area or Transmission constrained sub-area identified in the Resource Adequacy analysis for <del>year</del> <u>one+</u> per R1.2.</p>	<p>The <u>LSE or its delegated</u> Planning Coordinator did not document an assessment of its Resource Adequacy by comparing its load and resource capability per R2.</p>
<p><b>R3</b></p>	<p><u>The LSE reported to the MRO between 91 and 105 days of the effective date of RES-501-MRO-02_R3, for each portion of its load whether the LSE or its</u></p>	<p><u>The LSE reported to the MRO between 106 and 120 days of the effective date of RES-501-MRO-02_R3, for each portion of its load whether the LSE or its</u></p>	<p><u>The LSE reported to the MRO between 121 and 135 days of the effective date of RES-501-MRO-02_R3, for each portion of its load whether the LSE or its</u></p>	<p><u>The LSE reported to the MRO between 136 days or later of the effective date of RES-501-MRO-02_R3, for each portion of its load whether the LSE or its</u></p>

	<p><u>delegated Planning Coordinator will be performing the studies, providing the results, or reporting, as required, in order to meet Reliability Standards RES-501-MRO-02 R1 and R2 for that portion of its load.</u></p> <p><u>Or</u></p> <p><u>The LSE notified the MRO changes the party that is responsible for these tasks, 75 to 89 days prior to the proposed change or 150 to 179 days prior to the planning period under review, whichever is greater.</u></p>	<p><u>delegated Planning Coordinator will be performing the studies, providing the results, or reporting, as required, in order to meet Reliability Standards RES-501-MRO-02 R1 and R2 for that portion of its load.</u></p> <p><u>Or</u></p> <p><u>The LSE notified the MRO changes the party that is responsible for these tasks, 60 to 74 days prior to the proposed change or 135 to 149 days prior to the planning period under review, whichever is greater.</u></p>	<p><u>delegated Planning Coordinator will be performing the studies, providing the results, or reporting, as required, in order to meet Reliability Standards RES-501-MRO-02 R1 and R2 for that portion of its load.</u></p> <p><u>Or</u></p> <p><u>The LSE notified the MRO changes the party that is responsible for these tasks, 45 to 59 days prior to the proposed change or 120 to 134 days prior to the planning period under review, whichever is greater</u></p>	<p><u>delegated Planning Coordinator will be performing the studies, providing the results, or reporting, as required, in order to meet Reliability Standards RES-501-MRO-02 R1 and R2 for that portion of its load.</u></p> <p><u>Or</u></p> <p><u>The LSE notified the MRO changes the party that is responsible for these tasks, 44 days or sooner prior to the proposed change or 119 days or sooner prior to the planning period under review, whichever is greater</u></p> <p><u>Or</u></p> <p><u>The LSE did not provide the MRO with evidence of acceptance of the delegation by the applicable party.</u></p>
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**Version History**

Version	Date	Action	Change Tracking