

### 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**, the ability of supply-side and demand-side resources to meet the aggregate electrical demand (including losses).

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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
  - 4.2. Planning Coordinator
- 5. **Effective Date:** 1st day of the 1st calendar quarter after applicable regulatory approval, this standard will be effective. In those jurisdictions where no regulatory approval is required, this standard becomes effective on the 1st day of the 1st calendar quarter after NERC Board of Trustees adoption.

B. Requirements

- R1. Each Load Serving Entity and Planning Coordinator shall perform and possess the documentation of a planned Resource Adequacy assessment. To be valid, the Resource Adequacy assessment shall [Violation Risk Factor: Medium] [Time Horizon: Long-Term Planning]:
  - 1.1. Be performed annually, unless a review of the system data used in Resource Adequacy assessments is performed and it is concluded that there has been a lack of significant changes in the system data. A new Resource Adequacy assessment 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. A document summarizing the data review shall be prepared. The planned Resource Adequacy assessment is to be conducted for year one through year ten.
  - 1.2. Be supported by a study that covers a minimum of three periods within the year one, the planning year that begins with the upcoming peak season, through year ten to ensure meeting a loss of load probability target of no greater than 0.1 day per 1 year and no greater than 1 day per 10 years. The three periods are: 1] year one, 2] a minimum of one year within years two through five, and 3] a minimum of one year within years six through ten. This study shall:
    - 1.2.1. Use loads developed from the expected 50:50 probability peak 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 jurisdiction to take action to ensure the safety, adequacy, and reliability of electric service within that jurisdiction, as long as such action is not inconsistent with any reliability standard, as long as such action does not result in reducing reliability outside the jurisdiction than that provided by the reliability standards.

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**1.2.2.** Include transmission limitations that prevent delivery of generation reserves.

**Deleted:** <#>Include load forecast uncertainty such as uncertainty due to load diversity, seasonal load variation, and load variability due to other region economic forecasts or other factors.¶

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

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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.¶

**1.3.1** Resource availabilities:

- 1.3.1.1** Historic resource performance and any projected changes
- 1.3.1.2** Seasonal resource ratings
- 1.3.1.3** Modeling assumptions of non-conventional resources such as wind and cogeneration
- 1.3.1.4** Energy limitations of hydroelectric units.
- 1.3.1.5** Merchant plant availabilities
- 1.3.1.6** Modeling assumptions of firm capacity purchases from and sales to entities outside the **Load Serving Entity or the** Planning Coordinator area
- 1.3.1.7** Availability and deliverability of fuel
- 1.3.1.8** Common mode outages that affect resource adequacy
- 1.3.1.9** Other environmental or regulatory restrictions of resource availability
- 1.3.1.10** Available Demand-Side Management
- 1.3.1.11** Resource maintenance outage schedules
- 1.3.1.12** Sensitivity to resource outage rates and resource capabilities
- 1.3.1.13** Consider impacts of extreme weather/drought conditions

**1.3.2** Load **characteristics:**

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- 1.3.2.1** Load forecasts
- 1.3.2.2** Load forecast uncertainty
- 1.3.2.3** Load diversity
- 1.3.2.4** Seasonal load variations
- 1.3.2.5** Load variability due to weather, regional economic forecasts, etc.
- 1.3.2.6** Daily demand modeling assumptions (firm, interruptible)

**1.3.3** Transmission limitations that prevent the delivery of generation reserves:

- 1.3.3.1** Transmission maintenance outage schedules.
- 1.3.3.2** Transmission forced outage rates
- 1.3.3.3** Transmission availability for emergency considering firm commitments

**1.3.4** Modeling assumptions for emergency operation procedures used during unexpected resource outages.

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- 1.3.5 Emergency assistance from other interconnected systems including multi-area assessment considering transmission limitations.
- 1.3.6 **Market** resources not committed to serving load within the planned Resource Adequacy **assessment** analysis.
- 1.4. Express the planning reserve **margin developed from part 1.2** as a percentage of the 50:50 probability forecast peak load.
- 1.5. **Each Planning Coordinator and Load Serving Entity shall have documentation of the existence, nature, and holder of the rights to capacity resources outside the Planning Coordinator or Load Serving Entity area that are used in the assessment.**
- 1.6. **Each Load Serving Entity and Planning Coordinator shall document that the Load of the Load Serving Entity or the Load of the Planning Coordinator is fully accounted for in a Resource Adequacy assessment.**

R2. Each **Load Serving Entity and Planning Coordinator** shall annually document an assessment of its Resource Adequacy by comparing its load and resource capability for the ten year period in **part 1.1** expressed as a percentage of the 50:50 probability forecast peak load with the planning reserve margin benchmark in **part 1.4**. *[Violation Risk Factor: Lower] [Time Horizon: Long-Term Planning]*

**C. Measures**

- M1. **Each Load Serving Entity and Planning Coordinator shall perform and possess the documentation** of a valid planned Resource Adequacy assessment per Requirement R1. **If annual review of the system data used in the previous valid Resource Adequacy assessment is performed and it is concluded that there has been a lack of significant changes in the system data, a document summarizing that data review shall be prepared per part 1.1.**
- M2. **Each Load Serving Entity and Planning Coordinator shall annually document an assessment of its Resource Adequacy prepared** per Requirement R2.

**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 **Load Serving Entity and the Planning Coordinator** shall each retain the data necessary to conduct the analysis and documentation of the latest results from such analysis. In addition, entities found non-compliant shall keep information related to non-compliance until found compliant.

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- Deleted: <#>Each LSE shall report to the MRO within 90 days of the effective date of RES-501-MRO-02\_R3, for each portion of its load whether the LSE or its 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. If a LSE changes the party that is responsible for these tasks, the LSE shall notify the 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 delegation ...
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The Compliance Monitor shall keep the last audit and all subsequent compliance records.

**1.4. Additional Compliance Information.**

None specified

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2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	The <b>Load Serving Entity and the Planning Coordinator's</b> Resource Adequacy analysis failed to <b>document how and why 3 or more</b> of the <b>22</b> subcomponents <b>of : 1.3.1, 1.3.2, and 1.3.3.</b>	The <b>Load Serving Entity and the Planning Coordinator didn't document an annual review of the system data as per part 1.1.</b>	<b>Not applicable</b>	The <b>Load Serving Entity and the Planning Coordinator does not have a valid Resource Adequacy assessment as specified in requirement R1.</b>
	<b>OR</b>	<b>OR</b>		<b>OR</b>
	The <b>Load Serving Entity and the Planning Coordinator's</b> Resource Adequacy analysis failed to <b>document: 1] modeling assumptions per subcomponent 1.3.4, 2] emergency assistance from other interconnected systems including multi-area assessment considering transmission limitations per subcomponent 1.3.5, and 3] market resources not committed to serving load per subcomponent</b>	The <b>Load Serving Entity and Planning Coordinator failed to document their study per part 1.2.</b>		The <b>Load Serving Entity and the Planning Coordinator didn't perform an annual review of the system data as specified in Requirement R1.</b>
		<b>OR</b>	The <b>Load Serving Entity and the Planning Coordinator's Resource Adequacy analysis failed to document: 1] the planning reserve margin developed from part 1.2 as a percentage of the 50:50 probability peak load forecast per part 1.4, 2] the</b>	

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- OR ¶
- The LSE or its delegated 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 ¶
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	<b>1.3.6.</b>	<b>existence, nature, and holder of the rights per part 1.5, and 3] the Load of the Load Serving Entity, or the Load of the Planning Coordinator is fully accounted per part 1.6.</b>		
<b>R2</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Each Load Serving Entity and Planning Coordinator didn't annually document an assessment of its Resource Adequacy prepared per Requirement R2.</b>

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**OR¶**  
The LSE or its delegated Planning Coordinator Resource Adequacy analysis failed to include 1 of the Load forecast Characteristics subcomponents under R1.3.2 and documentation of its use¶  
**OR¶**  
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**Version History**

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