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New York State
Reliability Council
RA Working Group

RESOURCE ADEQUACY METRICS AND THEIR APPLICATIONS

April 2020

RA WORKING GROUP - OBJECTIVE

"Ensure that Executive Committee members are aware of current practices and proposals for resource adequacy metrics." This report responds to one action required for meeting this objective, to "gather information on current practices and proposals for resource adequacy metrics."

REPORT SECTIONS

This report provides:

(1) definitions of five commonly used resource adequacy metrics,

(2) a survey of metrics used in North America and around the world,

(3) application of various metrics in NYCA, and

(4) Working Group conclusion and recommendations.

RESOURCE ADEQUACY

METRIC DEFINITIONS

LOSS of LOAD HOURS (LOLH)

LOLH is generally defined as the expected number of hours per time period (often one year) when a system's hourly demand is projected to exceed the generating capacity. This metric is calculated using each hourly load in the given period (or the load duration curve).

LOSS OF LOAD EVENTS (LOLEV)

LOLEV, also known as loss of load frequency, is defined as the number of events in which system load is not served in a given time period. A LOLEV counts the expected frequency of continuous LOLH.

LOSS OF LOAD EXPECTATION (LOLE)

LOLE is defined as the expected number of days per time period (usually a year) for which the available generation capacity is insufficient to serve the demand at least once per day. LOLE counts the days having loss of load events, regardless of the number of consecutive or nonconsecutive loss of load hours in the day. Industry experts utilize various techniques from evaluating only the daily peak hour, subset of daily hours, or all daily hours.

LOSS OF LOAD PROBABILITY (LOLP)

LOLP is defined as the probability of system daily peak or hourly demand exceeding the available generating capacity during a given period. The probability can be calculated either by using only the daily peak loads (or daily peak variation curve) or all the hourly loads (or the load duration curve) in each study period.

EXPECTED UNSERVED ENERGY (EUE)

EUE is the summation of the expected number of megawatt hours of demand that will not be served in a given time period as a result of demand exceeding the available capacity across all hours. EUE is an energy-centric metric that considers the magnitude and duration for all hours of the time period, calculated in megawatt hours (MWh).

RA METRICS & CRITERIA AROUND THE WORLD

	Metric	**Criterion**
North America – NERC Regions		
NPCC – all 5 Areas	LOLE	0.1 days/year
MISO	LOLE	0.1 days/year
MRO – Manitoba	LOLE/LOLH/EUE	0.1 days/year
MRO – SaskPower	EUE	---
PJM	LOLE	0.1 days/year
SERC – all 4 Areas	LOLE	0.1 days/year
SPP	LOLE	0.1 days/year
TRE-ERCOP	LOLE	0.1 days/year
WECC – all 6 Areas	LOLP	0.02%
Western Europe		
Great Britain	LOLH	3 hours/year
France	LOLH	3 hours/year
Belgium	LOLH	3 hours/year
Netherlands	LOLH	4 hours/year
Ireland	LOLH	8 hours/year
Portugal	LOLH	8 hours/year
Australia	Normalized EUE	0.002%

METRIC COMPARISON: NYCA VS. OTHER MARKETS

***GE-MARS HAS THE CAPABILITY TO CALCULATE THE LOLH AND EUE METRICS AS WELL AS THE LOLE METRIC.**

	LOLE	LOLH	EUE	Normalized EUE
NYCA 2020 IRM Base Case	0.1 days/year	0.34 hours/year	235 MWh/year	0.00015%
US and Canada	0.1 days/year			
Western Europe		3 to 8 hours/year		
Australia				0.002%

CONCLUSION & RECOMMENDATIONS

Conclusion - The current 0.1 days/year LOLE criterion used in NYCA is consistent with that used by other NPCC Areas and most of the other North American regions, and the Working Group does not recommend a change to that criterion.

Recommendations - However, the Working Group recommends that the NYSRC Executive Committee approve the following actions:

1. It would be helpful when assessing resource adequacy, particularly of a system with a high percentage of intermittent renewable resource capacity, that the values for all three metrics, LOLH and EUE, as well as LOLE, be calculated. The Working Group therefore recommends that the NYISO and the NYSRC consider whether the 2021 IRM Study should calculate all three metrics and report them to the Executive Committee.
2. The NYSRC RA Working Group and NYSRC Executive Committee should monitor the following ongoing NYISO efforts to better understand the possible impacts of the recently enacted Community Leadership and Community Protection Act (CLCPA) in New York State. These efforts include the CARIS process, 2020 RNA, and announced NYISO Grid in Transition Study by The Brattle Group.
3. The Working Group recommends that the NYSRC support and actively participate in the planned NPCC evaluation of the applicability of alternative resource adequacy metrics that is scheduled to be initiated in 2020.

NEXT STEPS

- ✓ Please review the Draft RA Working Group Report
- ✓ Submit any edits or comments to Al Adamson and Chris Wentlent by April 16, 2020
- ✓ The RA Working Group will finalize the report for approval at the May 2020 NYSRC Meeting.