

Exceedance ENLR: Exceedance Capacity Counting for Wind and Solar Resources Using Targeted Sampling

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What Is Wrong with Current Exceedance Methods?

- ✧ **No correlation between VER production and capacity reduction at the time of actual system need**
- ✧ **The selection of the exceedance level is totally arbitrary – subjectively based on risk appetite**
 - **PG&E attempted to tie the selection of exceedance level to establish a correlation between VERs' output and load levels**
- ✧ **Capacity values can change dramatically and erratically at different exceedance levels especially with limited samples of widely varying data**



QC Calculation using Effective Net-Load-Reduction (ENLR) and Hybrid “Exceedance ENLR” Approach

Effective Net-Load Reduction Methodology (ENLR)

- ✦ ENLR calculates VERs’ QCs based on their output only during high-load hours – the hours that matter. A simple average of that data is then calculated
- ✦ The threshold level of high-load hours can be selected, e.g., as the top 20% load hours

Exceedance ENLR

- ✦ Rather than averaging VER generation output during high-load hours, an exceedance level is selected to determine QC values (given CPUC decision’s preference for exceedance approach), creating a hybrid of the Exceedance and ENLR approaches



VER QC: Exceedance ENLR Approach Using Actual 2019-2021 Data

4 PM August Time Slice: (~Gross Peak Load)

With correlation between VER generation and load captured via targeted sampling, CalWEA recommends ENLR or 50% Exceedance ENLR values be used for hourly VER QCs

	VER QC using Exceedance Method			
	50%	60%	70%	80%
Solar QC:	70.8%	68.2%	66.8%	61.6%
Wind QC:	25.5%	20.9%	17.1%	13.9%

VER QC using ENLR Method (Targeted Sampling)				
Sampling Load Threshold:	60%	70%	80%	85%
Sample Size (out of 93):	91	74	42	23
Solar QC:	70.2%	69.1%	67.1%	64.2%
Wind QC:	26.6%	28.0%	26.3%	25.3%



VER QC using Exceedance ENLR (at 50%)				
Sampling Load Threshold:	60%	70%	80%	85%
Sample Size (out of 93):	91	74	42	23
Solar QC:	71.9%	70.4%	67.9%	62.8%
Wind QC:	24.1%	27.3%	27.6%	26.3%

VER QC using Exceedance ENLR (at 70%)				
Sampling Load Threshold:	60%	70%	80%	85%
Sample Size (out of 93):	91	74	42	23
Solar QC:	66.3%	64.4%	60.9%	56.7%
Wind QC:	16.9%	18.4%	19.7%	19.9%



VER QC: Exceedance ENLR Approach Using Actual 2019-2021 Data

8 PM August Time Slice: (~Net Peak Load)

- ✦ If we want to be more conservative, that should be achieved by sampling at a higher load level (80% or 85%), not based on an arbitrary exceedance level of the unrefined samples
- ✦ PRM is the best place to address various uncertainties

	VER QC using Exceedance Method			
	50%	60%	70%	80%
Solar QC:	2.0%	1.4%	0.9%	0.7%
Wind QC:	43.3%	40.7%	36.4%	33.8%

VER QC using ENLR Method (Targeted Sampling)				
Sampling Load Threshold:	60%	70%	80%	85%
Sample Size (out of 93):	93	91	69	50
Solar QC:	2.2%	2.3%	2.1%	1.9%
Wind QC:	44.1%	44.3%	43.2%	43.1%



VER QC using Exceedance ENLR (at 50%)				
Sampling Load Threshold:	60%	70%	80%	85%
Sample Size (out of 93):	93	91	69	50
Solar QC:	2.0%	2.1%	2.0%	1.7%
Wind QC:	43.3%	43.8%	43.0%	44.5%

VER QC using Exceedance ENLR (at 70%)				
Sampling Load Threshold:	60%	70%	80%	85%
Sample Size (out of 93):	93	91	69	50
Solar QC:	0.9%	0.9%	1.0%	0.9%
Wind QC:	36.4%	36.4%	35.5%	34.8%