

# **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 70% 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)**

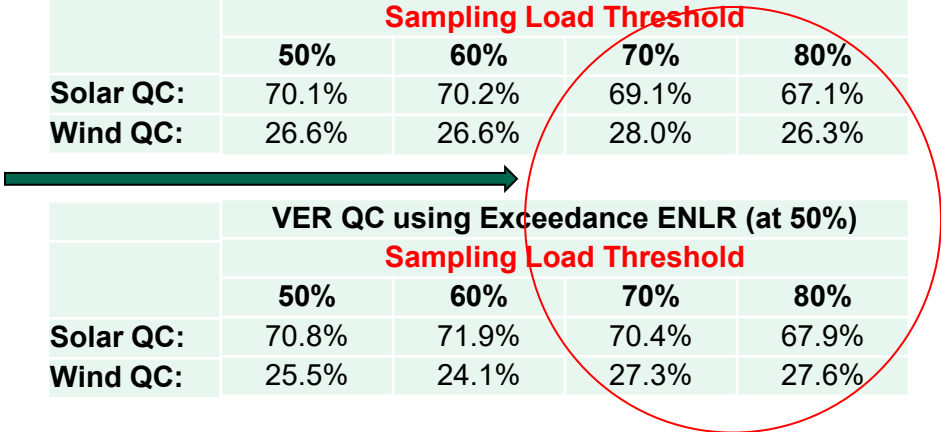
✦ With correlation between VER generation and load captured via targeted sampling, we believe that the Average ENLR or 50% Exceedance ENLR values should be selected for hourly VER QCs

	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 Average ENLR Method			
	Sampling Load Threshold			
	50%	60%	70%	80%
Solar QC:	70.1%	70.2%	69.1%	67.1%
Wind QC:	26.6%	26.6%	28.0%	26.3%

	VER QC using Exceedance ENLR (at 50%)			
	Sampling Load Threshold			
	50%	60%	70%	80%
Solar QC:	70.8%	71.9%	70.4%	67.9%
Wind QC:	25.5%	24.1%	27.3%	27.6%

	VER QC using Exceedance ENLR (at 70%)			
	Sampling Load Threshold			
	50%	60%	70%	80%
Solar QC:	66.8%	66.3%	64.4%	60.9%
Wind QC:	17.1%	16.9%	18.4%	19.7%





# 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 (70% or 80%), 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 Average ENLR Method			
	Sampling Load Threshold			
	50%	60%	70%	80%
Solar QC:	2.2%	2.2%	2.3%	2.1%
Wind QC:	44.1%	44.1%	44.3%	43.2%

	VER QC using Exceedance ENLR (at 50%)			
	Sampling Load Threshold			
	50%	60%	70%	80%
Solar QC:	2.0%	2.0%	2.1%	2.0%
Wind QC:	43.3%	43.3%	43.8%	43.0%

	VER QC using Exceedance ENLR (at 70%)			
	Sampling Load Threshold			
	50%	60%	70%	80%
Solar QC:	0.9%	0.9%	0.9%	1.0%
Wind QC:	36.4%	36.4%	36.4%	35.5%