

# Section 505.2 - Performance Criteria for Refund of Generating Unit Owner's Contribution Solar Performance Analysis

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**Classification:** AESO Internal

## Objective

The AESO will be required to assess the generation performance of the first transmission or distribution connected solar generator for the full year of 2019. In order to provide the appropriate signal to solar generation regarding the refund of their Generator Unit Owner Contribution (GUOC) amounts, solar performance criteria in regards to GUOC refund should:

- (1) reflect a reasonable lowest bound for expected solar performance in Alberta; and
- (2) minimize qualifying availability to allow a linearly graduated refund to encourage continued generation maintenance and operation in case a generating unit owner cannot reach the reasonable lowest bound for the calendar year but can still get reasonably close.

The performance criteria recommended should reflect a range of average hourly availability to be included in Section 505.2 of the ISO rules, *Performance Criteria for Refund of Generating Unit Owner's Contribution* ("Section 505.2"). The higher number of the range will allow Objective (1) to be achieved, and the lower number of the range will ensure Objective (2) is achieved.

## Approach for Data Analysis

The AESO will review hypothetical solar generation expected output in a region in Alberta (Fort McMurray) where availability should be at the "reasonable lowest bound".

In order to determine the lower bound of the range, the AESO will determine a value less than the reasonable lowest bound that is in line with other ranges already included in Section 505.2.

## Analysis

### Reasonable lowest bound

Low end historical capacity factor estimates based on a hypothetical solar facility in Fort McMurray were acquired from the National Renewable Energy Laboratory's (NREL) National Solar Radiation Database (NSRDB)<sup>1</sup> via an AESO consultant. Based on data from 1998 – 2016 for a solar facility with a fixed tilt set up and a DC to AC ratio of 1, the worst performance year from the data set was 1999 with a capacity factor of 12.32%. The 12% (rounded down) represents a reasonable lowest bound capacity factor value above which any transmission or distribution connected future solar facility should be able to perform as the northern location and technology chosen for the analysis are highly unlikely to be considered by solar developers.

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<sup>1</sup> <https://nsrdb.nrel.gov/nsrdb-viewer>, <https://sam.nrel.gov/download>

## Minimum qualifying availability

The minimum qualifying availability start amount of 0.08 was selected to reflect a reasonable range, in line with other generation types ranges already included in Section 505.2. Given the low “reasonable lowest bound” availability of 0.12 selected for solar, it was determined that the option for the minimum qualifying availability (rounded to nearest full percentage) would be 0.7, 0.8 or 0.9.

Generation type	Minimum qualifying availability	Reasonable lowest bound	Range	% of reasonable lowest bound
Thermal (non-BTF)	0.60	0.80	0.20	25%
Hydro, wind, less than 5 MW	0.15	0.25	0.10	40%
BTF	0.60	0.80	0.20	25%
Solar – Option 1	0.07	0.12	0.05	42%
Solar – Option 2	<b>0.08</b>	0.12	<b>0.04</b>	<b>33%</b>
Solar – Option 3	0.09	0.12	0.03	25%

The Option 2 of the minimum qualifying availability of 0.08 was selected to balance a reasonable amount of range (0.04) as well as maintain a percentage of the reasonable lowest bound in line with the other generation types already included in Section 505.2.

Option 3, maintaining the 25% of reasonable lowest bound range, was ruled out as the range (0.03) was determined to be too small to encourage Objective (2) above as well as account for a number of different solar technologies. Option 1, with a large range (0.05) was ruled out as it was larger than other generator types’ % of reasonable lowest bound. As well the range of 0.60 – 0.80 for thermal and BTF is required as those categories contain a large range of technology types.