

Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: August 29, 2018

Re: Briefing on renewables in the generator interconnection queue

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This briefing provides the status of renewable generation in the ISO's generator interconnection queue as of August 1, 2018. Key highlights include:

1. The current ISO queue contains approximately 60,000 MW actively seeking to interconnect to the ISO controlled grid. Renewables account for 45,589 MW, of which 21,624 MW has completed the study process and 23,965 MW are in various stages of the study process.
2. Changes in renewable project capacity in the queue since the June 2017 update include 539 MW of capacity that reached commercial operation, 8,508 MW of project withdrawals, 15,106 MW still active that entered in the cluster 11 window that closed April 16, and a net increase of 143 MW related to various project modifications.
3. ISO load serving entities estimate 1,300 MW of additional renewable capacity is needed to meet the 33% Renewables Portfolio Standard mandate for 2020. Essentially all of the 1,300 MW needed has been procured by the California IOUs and is expected to reach commercial operation by 2020.
4. While not considered renewable generation, energy storage projects represent a significant portion of the capacity in the ISO queue, totaling 24,812 MW. The technologies include battery, pump storage, rail energy storage, and compressed air energy storage.

DISCUSSION

The following graphs illustrate the renewables in the ISO queue from several perspectives.

Figure 1 shows the amount of renewable generation in the interconnection queue over time and breaks out the types of renewable capacity. During the June 2017 to August 2018 period, the queue experienced a net increase of 6,202 MW in renewable project capacity. The change is a result of 539 MW of capacity that reached commercial operation, 8,508 MW of project withdrawals, 15,106 MW of new cluster 11 projects, and a net increase of 143 MW related to various project modifications.

Figure 1
Change in renewable capacity in the ISO queue since June 2011

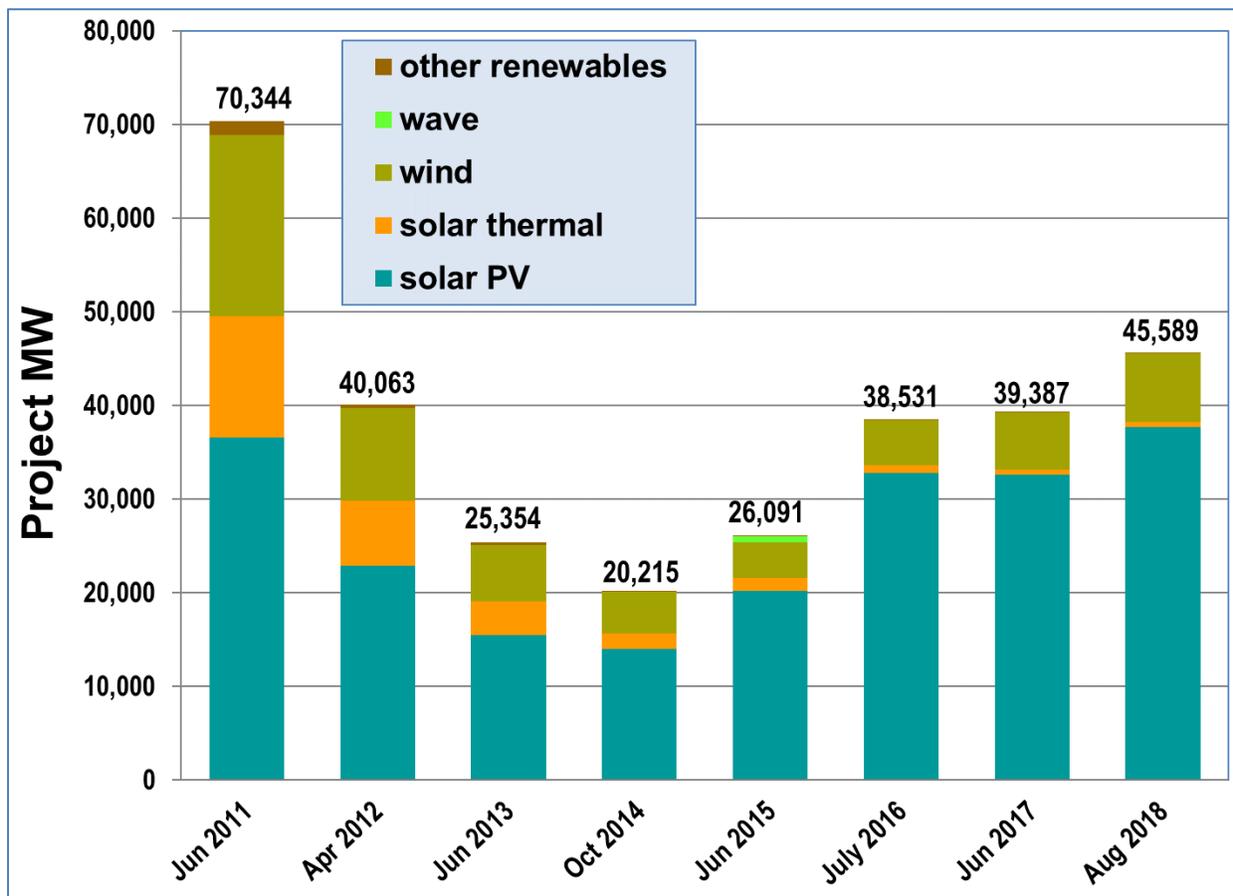


Figure 2 displays the amount of renewable capacity in the queue by study group and shows the capacity reductions within each study group. The active project portion of each bar, shown in blue, represents the August 2018 capacity that remains in each study group. Significant capacity (5,006 MW) withdrew from cluster 9 following the Phase I study process and 15,106 MW entered the new cluster 11.

Figure 2
Renewable generation capacity in the ISO queue by study group
(changes by study group since the June 2017)

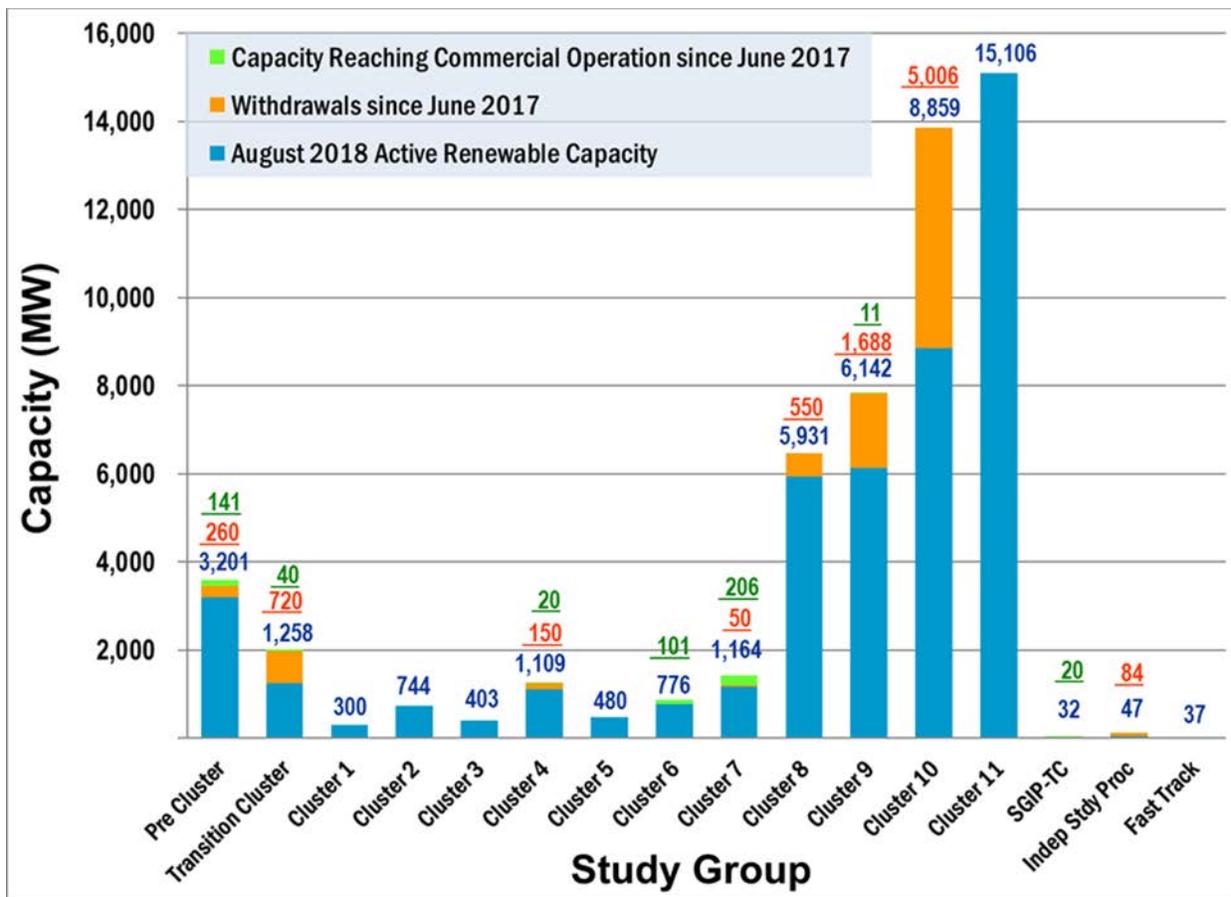


Figure 3 provides insight into the amount of active generator project capacity in the ISO queue by project size and type. Solar PV is the dominant generator technology for all size ranges. Figure 3 also provides a breakdown of the capacity in the ISO queue by the number of projects for each project size category. Projects in the 100 to 500 MW category make up 63% of project capacity. The queue has four (4) projects with a renewable component over 1,000 MW totaling over 7,000 MW (three solar and one offshore wind).

Figure 3
MW of renewable projects in ISO queue
As of August 2018 by size and type

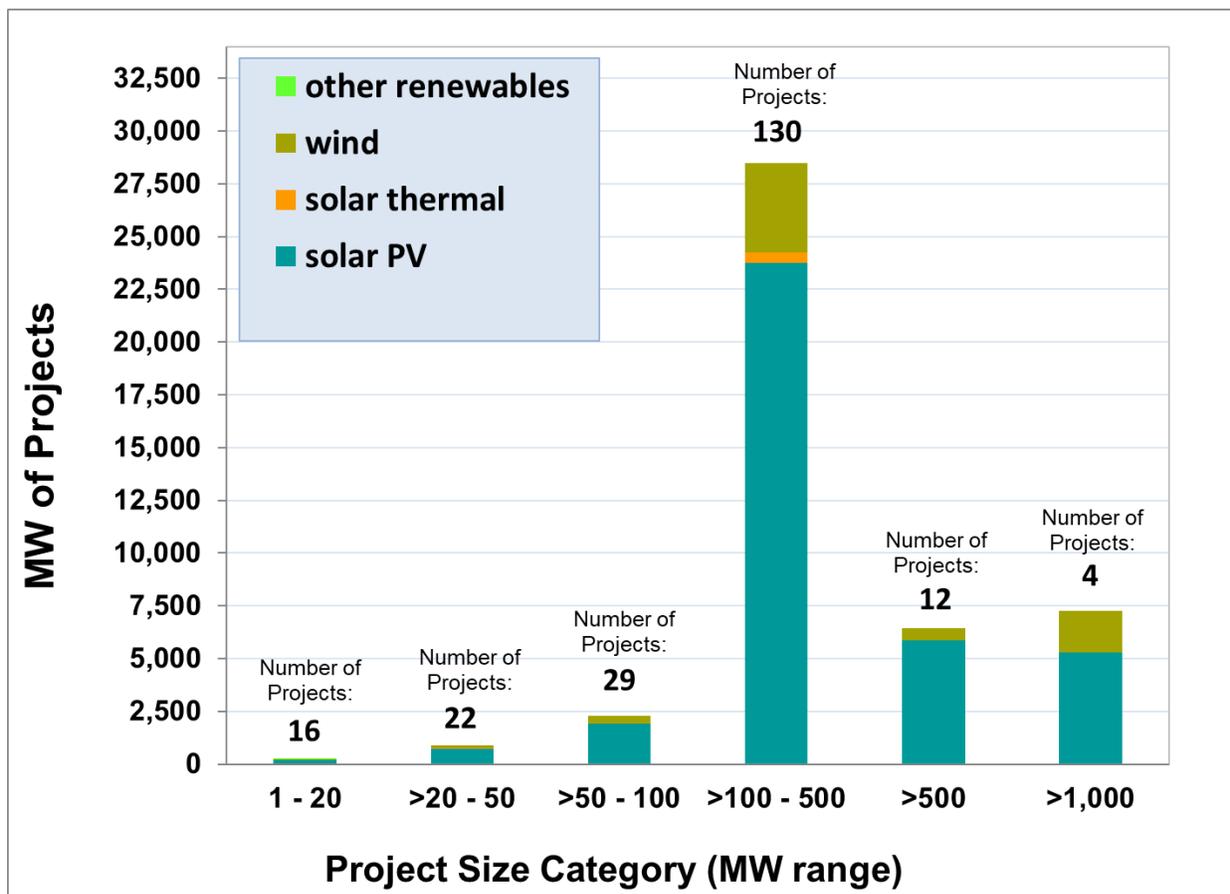
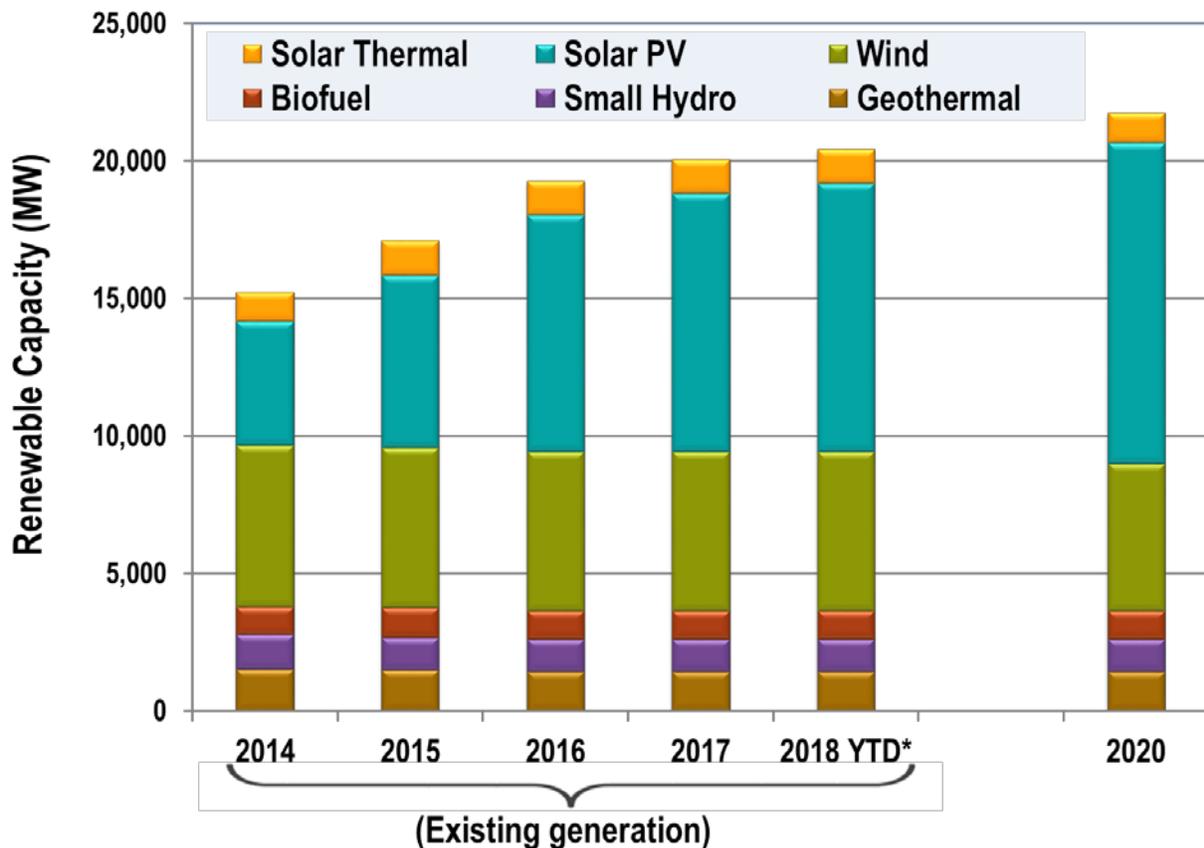


Figure 4 shows the historical and projected year 2020 build-out of renewable capacity by technology type based on projections from the investor owned utilities. The projected ISO connected renewable generation to be in operation in 2020 is 21,800 MW. The estimated capacity required by 2020 has decreased by approximately 1,000 MW since the July 2017 report because of lower energy load projections for 2020. The lower load is primarily due to the ongoing installation of behind-the-meter solar systems. The ISO currently has approximately 20,400 MW of operating renewable generation within its footprint, which leaves approximately 1,400 MW remaining to reach commercial operation between now and 2020. The majority of this amount is presently under contract with the three California IOUs.

Figure 4
Projected RPS capacity build-out through 2020
(IOU projections)



*All online resources that are not in test mode are included in the 2018 YTD amounts, including those yet to achieve full commercial operation.

Figure 5 is a map of all projects in the generation interconnection queue as of August 2018 and shows the general location and capacity by project type, including conventional generation and storage project capacity. Some storage capacity is associated with other generation technologies within a single project, typically solar PV. In a number of these cases, the total project output is designed to not exceed the capacity of the solar portion of the project. However, in this table all technology types are provided at their full capability on a stand-alone basis (e.g. for a combined solar / storage project, both the solar capacity and the storage capacity are shown separately even though the total project output cannot exceed the rating of the solar portion of the facility). As a result, the total capacity of all projects shown here is greater than the total project capacity in the ISO generation interconnection queue.

Figure 5
ISO Queue Map – Conventional & Renewables
As of August 2018

