BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

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COMMENTS OF FIRST SOLAR, INC. ON PROPOSED DECISION OF ALJ FITCH ADOPTING PREFERRED SYSTEM PORTFOLIO AND PLAN FOR 2017-2018 INTEGRATED RESOURCE PLAN CYCLE

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I. Introduction

First Solar, Inc. (First Solar) herein submits comments in response to the March 18, 2019 proposed decision ("PD") of Administrative Law Judge Fitch adopting a Preferred System Portfolio and Plan ("PSP") for the 2017-2018 Integrated Resource Plan ("IRP") cycle.

II. Background on First Solar

First Solar is the world's largest thin-film photovoltaic ("PV") solar module manufacturer and the largest solar manufacturer in the Western hemisphere. The company develops, designs, constructs, and operates PV solar power systems globally, using its vertically-integrated structure to deliver PV solar energy solutions. First Solar is headquartered in Tempe, Arizona, has manufacturing facilities in Ohio, and is publicly traded on the NASDAQ as FSLR.

Over 20 GW of First Solar modules have been installed globally, displacing nearly 12 million metric tons of CO2 per year.[1] First Solar has designed, built and commissioned over 7 GW of projects globally, including approximately a third of the currently-operating solar PV generation fleet supplying the State of California. First Solar has constructed over thirty-four generating facilities that operate to serve the State, totaling over 4.6 GW, including two of the largest solar

[1] http://www.firstsolar.com/-/media/First-Solar/Sustainability-Documents/FirstSolar_SustainabilityReport.ashx

facilities in the world: the 550 MW Desert Sunlight project and the 550 MW Topaz project. In our current development pipeline, we have ten contracted projects in California, Nevada, Utah, and Arizona that will reach substantial completion and add over 1 GW of utility-scale solar to the western grid by the end of 2021.

First Solar is well-situated to continue to help the State achieve its ambitious greenhouse gas reduction goals and increased renewable portfolio standard targets with a low-cost resource that is fully capable of providing essential reliability services.

III. First Solar Recommends Modification of the PSP to Accurately Model Full Capacity Deliverability and Reflect Reliability Attributes of Inverter-Based Resources

First Solar appreciates the ability participate in this important docket and provide feedback to the Commission for review and consideration. The IRP process is critical for the future of California's power system as it provides the opportunity to analyze the system as a whole and gain an understanding of how disparate planning processes aggregate together to form a cohesive, integrated solution set. To that end, we support the PD's Findings of Fact 25 thru 28 that articulate the importance of this exercise. The IRP process provides the best opportunity to benchmark the State's progress against its environmental objectives and ensure consumers a safe, reliable, and affordable energy supply.

It is precisely due to the importance of this process that First Solar proposes substantial modifications to the PSP and recommends the Commission revise this plan to reflect the commercial and technical considerations outlined in these comments. There are two specific aspects of the PSP that prevent our support, as discussed in greater detail below: (1) the reliance on Energy Only ("EO") resources to meet system needs, which does not reflect current market realities; and, (2) the reliance on fossil-fueled units to provide system reliability and renewables integration services.

1) The PSP Fails to Ensure Firm Deliverability of Required New Resources

The IRP process, at its base, must ensure the ability in the future of the planning entity to meet load in a reliable manner. From such a starting point, the planning entity can analyze system costs, emissions, water usage, fuel risk, and other important metrics. However, first and foremost, an individual portfolio of resources must be deemed capable of meeting load.

First Solar strongly contests the unproven assumption that a significant portion of incremental resources required by this plan can be developed and procured as EO for purposes of deliverability. EO resources are considered non-firm resources, meaning they do not have guaranteed access to the transmission system at all times. Off-takers desire guaranteed access from resources with full capacity deliverability. As such, we believe it is unrealistic to expect that EO resources would be able to meaningfully participate in the wholesale market. However, the PSP assumes otherwise without sufficient explanation. Specifically, as illustrated in Table 3 of the PD on page 110, 4,662 MW of the 11,966 MW of new renewable buildout – 39% of incremental capacity – is assumed to be EO, or non-firm capacity in nature. It is further assumes that the vast majority of that capacity – 3,207 MW – would come from utility-scale solar PV power projects. We are currently unaware of any off-takers willing to contract for energy supply without firm deliverability, as represented by Full Capacity Deliverability Status ("FCDS"), nor do we expect that market demand to change. This is a fundamental and significant flaw in the PSP, as it fails to recognize market realities to meet the base requirement that the IRP process ensure a reliable system.

Reliance upon non-firm power, which LSEs are currently unwilling to purchase, will undercut the ability of renewable resources to participate in the market. This in turn will undermine the usefulness of the IRP as a tool to meet the State's energy objectives. An IRP that does not account for all costs needed to deliver firm power or how to contract for non-firm power will not be able to successfully guide LSEs to meet state objectives. Specifically, the EO assumptions fail to effectively direct the CAISO TPP to identify reasonable transmission upgrades that open up considerable access to low-cost renewable resources to meet these goals. As an example, Gridliance West's initial comments to the Proposed Preferred System Portfolio and Transmission Planning Process Recommendations highlight modest, localized transmission upgrades that, if studied, could unlock significant production cost savings and enable CAISO-deliverable projects to receive FCDS.[2]

The flawed EO assumptions create other problems. First, by relying heavily upon EO projects, the PSP drastically underestimates the total cost of the portfolio to consumers. For projects to be financed and constructed, they will need transmission system upgrades that will allow them to compete in wholesale markets. The costs to provide that required deliverability appear to be absent

[2] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M268/K737/268737721.PDF

from consideration in the PSP. We believe the PSP needs to consider the transmission upgrades that will be needed to meet GHG emission reduction goals

Second, the PSP fails to recognize that there is no existing market for EO projects in California, and as such they are extremely difficult to finance. First Solar is not currently aware of any LSE willing to consider executing an agreement for an EO asset as the risk of curtailment of these resources renders projects unfinanceable. The PSP's assumption that 39% of the new renewable build, and more than 50% of the new utility-scale solar PV build will be served from EO projects does not reflect market conditions.

Third, the PSP shifts the vast majority of the burden for EO contracts to one specific fuel source – utility-scale solar PV resources. Indeed, the PD explicitly states that "[t]o the extent possible, new geothermal and wind resources were changed to be fully deliverable [.]"[3] While the IRP is an appropriate forum to consider the balance of fuel source risk, predetermination of resource adequacy by fuel source is inappropriate and does not reflect how current transmission access is allocated. The PSP's reliance upon EO for a significant portion of new resources, heavily burdened by one specific technology, creates a very real risk that the proposed resources will not materialize, resulting in the State failing to meet its greenhouse gas emission reduction goals. The PSP should be rerun to accurately capture the need for transmission system upgrades to provide firm deliverability for all of the resources that will be needed to meet the State's objectives. To do otherwise misrepresents the level of GHG reduction and level of system reliability that may be achieved.

Lastly, First Solar recommends the Commission coordinate a workshop with the CAISO to discuss the ramifications of relying significantly upon EO resources for future needs. Specifically, this workshop would review EO procurement and contracting requirements, concerns of the renewable development community, and the needed transmission upgrades and associated costs that could facilitate EO resource contracting. This workshop could be held concurrently with the procurement track, referenced on page 136 of the PD, so that the lessons learned and solutions identified are incorporated in a timely manner.

[3] Proposed Decision at page 116.

2) The PSP Fails to Consider the Ability of Renewables to Provide Flexible Dispatch and Points Instead to Fossil-fueled Generation

First Solar appreciates the fact that the PSP recognizes the potential for renewable resources "to provide additional ramping and load following services to decrease renewable integration challenges at the system level."[4] Beyond this statement, however, it does not appear that these capabilities were integrated into the PSP analysis. Rather, the PSP repeatedly points to fossil fuel and baseload resources as necessary for system reliability in 2030.[5] This myopic view manifests itself in the results outlined in Table 2 on page 105 of the PD, where emissions and curtailment results are compared across various portfolios.

Modeling conducted by Energy + Environmental Economics ("E3") on behalf of First Solar and Tampa Electric Company ("TECO") and published in October 2018 quantified the benefits of treating utility-scale solar as a flexible, dispatchable resource.[6] The more integrated the resource became with unit commitment and dispatch decisions, the more benefits redounded to consumers. E3 modeled utility-scale solar as capable of providing both footroom (allowing the resource to provide downward reserves in cases where demand is lower than forecast) and headroom (under-scheduling the resource day-ahead to reduce its own forecast error and provide upward ramping capabilities such as regulation and spinning reserves), allowing the production cost model to leverage this zero marginal cost resource in new ways. This resulted in reduced unit commitments of the fossil fleet, as they were no longer as critical in providing balancing services. Removing some of those units from the dispatch stack also removes their minimum generation levels (e.g., Pmins), creating additional room for renewables to operate. As such, at very high penetration levels, more renewables were delivered to the grid even though the opportunity to be curtailed was greater. This resulted in increased cost savings to consumers as well as reduced emissions on the grid.

First Solar strongly recommends the Commission consider replicating this study on the California grid as part of the IRP process. While we believe similar results will occur, each balancing area

[4] PD Finding of Fact 34, page 158.
[5] *See*, for example, Findings of Fact 31 thru 33, pages 157-158.
[6] Nelson, J. et al. October 2018. *Investigating the Economic Value of Flexible Solar Power Plant Operation*. Energy & Environmental Economics. https://www.ethree.com/wp-content/uploads/2018/10/Investigating-the-Economic-Value-of-Flexible-Solar-Power-Plant-Operation.pdf

has unique load patterns, generation resources, and transmission import and export capabilities that warrant consideration. We are confident that by replicating this study, the concerns raised within the PD regarding the need for additional fossil-fueled resources with load following and inter- and intra-hourly renewable integration capabilities will be minimized. Moreover, such a study would provide the basis under which new procurement initiatives could be drawn that require flexible, dispatchable renewables to help California meet GHG emission reduction goals.

IV. Conclusion

First Solar appreciates the opportunity to provide input in response to the March 18, 2019 proposed decision on the 2017-2018 IRP cycle.

Dated: April 8, 2019

Respectfully submitted,

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