

## **Comments Following the February 28 Meeting on the Draft 2017-2018 Transmission Planning Process (TPP) Study Plan and Special Studies Updates (50% RPS, Bulk Storage)**

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The two comments below concern hourly net export limits, which are significant modeling assumptions for the 50% RPS and bulk storage special studies as well as for TPP studies. These limits on modeled hourly physical export flows from the CAISO-controlled area are intended to offset the recognized tendency of production simulations to produce more highly optimized solutions than are likely in the real world. This is attributed to “friction” in real-world transactions, such as transaction costs, embedded commitments and practices (including contracts), market timelines, risk management, etc.

Electric system planning confronts large change and uncertainty regarding resources mix and operation, and regarding future electricity markets. This makes it difficult to estimate the extent to which market “friction” may cause simulated exports under overgeneration conditions (surplus solar generation) to exceed what would occur in reality. In production simulation studies such as the following, export limit assumptions significantly impacted key results such as ramping capacity adequacy, transmission needs/congestion, renewable generation curtailment/overbuild, cost effectiveness of storage, and overall system costs.

- Flexibility (renewables integration) studies conducted by the CAISO and separately by SCE for recent CPUC Long Term Procurement Plan proceedings
- The CAISO’s high RPS (e.g., 50% RPS) special studies
- SB 350 (CAISO regionalization) study (Brattle et al.),  
[https://www.aiso.com/Documents/SB350Study\\_AggregatedReport.pdf](https://www.aiso.com/Documents/SB350Study_AggregatedReport.pdf)
- Western Interconnection Flexibility Assessment (E3/NREL),  
[https://www.wecc.biz/\\_layouts/15/WopiFrame.aspx?sourcedoc=/Reliability/WECC\\_Flexibility\\_Assessment\\_Report\\_2016-01-11.pdf&action=default&DefaultItemOpen=1](https://www.wecc.biz/_layouts/15/WopiFrame.aspx?sourcedoc=/Reliability/WECC_Flexibility_Assessment_Report_2016-01-11.pdf&action=default&DefaultItemOpen=1)
- NREL/CEERT Low Carbon Grid Study,  
<http://www.nrel.gov/docs/fy16osti/64884.pdf>
- NREL/Helman Analytics study on benefits of storage in California,  
<http://www.nrel.gov/docs/fy16osti/65061.pdf>

Export limits will continue to impact studies which in turn may impact planning decisions. Comments below emphasize the need to (1) adequately account for export uncertainties, and (2) clarify and discuss how export limits are modeled.

***Planning Studies Should at a Minimum Describe Implications of Alternative Export Limits, and Studies that Support Planning Decisions or Analyze Sensitivities Should Model Alternative Export Limits.***

This provides needed perspective and insight, especially when combined with assessment of evolving market activity. For example, if bulk storage study sensitivities are run, higher export limits should be examined in conjunction with other sensitivities.

***The Conceptual Rationale for Export Limits and How It Informs Modeling Should Be More Fully Explained to Support Understanding and Constructive Discussion.***

Modeled export limits are consequential as discussed above, and are based on conceptual market transactions as opposed to physics and operating costs that are explicitly modeled. For credibility, understanding and constructive discussion it is important to explain the conceptual view of export/import transactions and how it informs modeled MW export limits. This should include explanation and justification of what must-take import transactions are assumed to exist in *overgeneration hours 10+ years from now*, and whether these equate to “dedicated” imports as defined on page 210 of the draft 2016-2017 Transmission Plan.<sup>1</sup> The assumed resource sources for must-take imports and their assumed contractual must-take MW in overgeneration hours 10+ years from now should be fully enumerated. The CASIO

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<sup>1</sup> The Draft 2016-2017 Transmission Plan (January 31, 2017) on page 210 in the section on the Risk of Retirement special study states: *In the model, must-take import is called dedicated import. Dedicated import includes two categories. The first is the import of 70% generation by the out-of-state California RPS renewable resources. California parties own portions of some out-of-state non-renewable resources, such as Hoover, Palo Verde, etc. The other category of dedicated import is the import of generation by these resources that belongs to the California parties.*

should clarify whether these must-take imports are assumed to be entirely re-exported versus offset by additional exports from CAISO area generation, whether this is considered to occur in a day ahead time frame, if/how real time adjustments also contribute to exports and re-exports, and how the combination of re-export assumptions plus projected high solar generation supports a 2000 MW export modeling limit 10+ years from now.

It would be helpful if the following situation could be clarified. Slide 56 of the 50% RPS special study portion of February 17 presentations on the draft 2016-2017 Transmission Plan refers to RPS generation curtailment results being “*Higher numbers compared to last year - due to enhanced ISO export limit modeling.*” Remarks at the meeting appeared to indicate that dynamically scheduled and pseudo-tie generation were involved in this modeling adjustment. The CAISO should explain the conceptual rationale for this adjustment as well as which studies include the adjustment. Are dynamically scheduled and pseudo-tie generation considered to represent additional must-take import transactions not previously included in aggregate must-take imports for purposes of assessing appropriate export limits? Or, is there another rationale for the adjustment? And, what is the MW magnitude of this net export limit modeling adjustment?

Modeling of different net export limits by the CASIO and others has to date been informative. The importance of this unresolved uncertainty justifies further attention at the conceptual and modeling levels.

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