

**Response of the California Transmission Planning Group  
Technical Steering Committee Study Team**

**California Public Utilities Commission Energy Division Staff  
Re CTPG's draft Phase 1 Study Report**

**Comment Received:**

The CPUC Energy Division Staff asked several questions, followed by recommendations regarding specific study information that should be provided to stakeholders, either within or appended to study reports. The requested information corresponds to the data structures in the WECC 2019 Heavy Summer 1A power flow case and CTPG's modifications of that case.

1. Before adding renewable generation to reach the 33% RPS goal, which (if any) of the study cases correspond to the WECC 2019 HS1A 'seed case' in terms of load and generation levels? How was that 2019 HS1A case modified to produce each of the study cases, in terms of load, generation and other changes?

**CTPG Study Team Response:**

None of CTPG's Phase 1 study cases correspond to the WECC 2019 HS1A "seed case" in terms of load and generation levels. Cases A0, B0 and C0 each modified the loads in the seed case to reflect the load levels specified on Table 5 of the draft Phase 1 study report. Generation in each of these cases was also modified in order to balance WECC loads with WECC generation. Exactly which generators were modified by how much has not, to date, been disclosed by the modelers performing the respective power flow studies.

2. Other than renewable generation added to produce 33-percent Renewable Portfolio Standard cases, what new generation not currently operating is included in each of the five California "areas" represented in WECC power flow cases (PG&E, Southern California, SDG&E, Imperial, and LADWP), and what *currently operating* generation is either assumed to retire or given zero output under all cases? If specific generation additions and retirements are confidential, aggregated MW would be helpful.

**CTPG Study Team Response:**

Other than new renewable generation sufficient to meet California's 33-percent RPS goal, no new generation was added in any of the CTPG cases. A list of the fossil-fired generation that was operating in the WECC 2019 HS1A "seed case", and turned off in order to accommodate the increase in renewable generation in the A2, B2 and C2 cases, has never been assembled outside the respective power flow cases. This information can be determined by examining the power flow cases which will be made available to interested stakeholders executing or holding the appropriate non-disclosure agreements.



3. Documentation accompanying WECC's 2019 HS1A case describes that case as representing high hydroelectric conditions in California. Which of the CTPG-run cases represent high hydro generation for California, or parts of it? What hydroelectric generation changes, if any, do these cases entail, relative to hydro generation levels in the HS1A case? Which study cases represent or will represent (in Phase 2 studies) average and low hydroelectric conditions, and how were these hydroelectric generation inputs derived?

**CTPG Study Team Response:**

California hydroelectric generation was not modified in any of CTPG's cases from the levels represented in WECC's 2019 HS1A "seed case." At this time, the CTPG does not plan to investigate the impacts of "average" and "low" California hydroelectric conditions on scenarios that include enough RPS-qualifying renewable generation to meet California's 33-percent RPS goals.

4. Was the SCIT nomogram or other aggregate limit on imports to coastal Southern California explicitly enforced? Monitored? How? How and in what total MW amount did added Southern California renewable generation contribute to "imports", and to internal generation, for purposes of SCIT or other import limits? What, if any, is the estimated impact on SCIT or other southern California import limits, of the CTPG study's identified conceptual transmission additions, assumed renewable generation additions, and redispatch?

**CTPG Study Team Response:**

The SCIT nomogram was not explicitly enforced in CTPG's Phase 1 studies. CTPG's Phase 1 studies made no determination as to what amount of new renewable resources modeled in the studies would be inside or outside of the SCIT nomogram. CTPG's Phase 1 studies did not estimate the impact of the identified conceptual transmission plan additions or the electrical distribution of renewable resource additions and decremented fossil-fired generation on the SCIT nomogram.

With respect to other southern California import limits, the addition of network transmission between southern Nevada and southern California is expected to increase the existing east to west rating for the northern portion of the West of River path. The addition of transmission in the Midway-Gregg corridor is expected to increase the capability of Path 15 in the north-to-south direction and the addition of transmission between Kramer and Midway is expected to increase the capability of Path 26 in the north-to-south direction. Assumed renewable generation additions and the associated decrements of fossil-fired generation are not expected to have any impact on these import limits.

5. Tables 9, 10 and 21 in the January 13 Draft Report on the Phase 1 studies provide valuable information on flows over major ties. It would be helpful to know how flows in the original WECC 2019 HS1A case correspond to the flows depicted in such tables, by adding the HS1A flows to the tables. It would also be helpful to clarify which listed flows represent 'actual' flows based on power flow simulation, and which represent scheduled flows developed as inputs or targets for the cases, and how the two kinds of flows correspond. Consistent with question 4, above, it would be helpful to add to the flow table the limit (under conditions simulated) and

actual (simulated) flows into the coastal Southern California area for which the SCIT nomogram or other (please identify) import limits apply.

**CTPG Study Team Response:**

The CTPG Study Team is evaluating this suggestion.

6. Regarding out-of-state areas, there should be reporting of aggregate west-wide (non-California) load and losses, as well as aggregate and disaggregated (see below) generation levels, including both Pmax and Pgen.<sup>1</sup> This should be done for the original HS1A case and for each study case, both before and after adding all renewables and re-dispatching. For disaggregated generation information, it is at a minimum important to break out coal, other fossil, and storage/dispatchable hydro (pumped storage separately), since these are potentially amenable to re-dispatch. Additionally, the Pmax and Pgen for the *added out-of-state renewables to meet California's 33-percent RPS* under different cases should be shown, by technology and state. Finally, it would be valuable to report west-wide wind generation included in each case (aggregate Pmax and Pgen) separately, *aside from* what the CTPG has added to represent California's 33-percent RPS goal. This is because we are likely to see deployment of large amounts of non-California wind generation to meet other states' RPS requirements, beyond what is included in the WECC 2019 HS1A case. For building on the CTPG-developed conceptual plan going forward, it will be helpful to consider the implications of such higher levels of west-wide wind generation.

To recap, the above requested information on out-of-state generation assumptions will help stakeholders understand and consider the implications of (1) modifications of the original HS1A case to produce the cases studied by the CTPG, and (2) further modifications to simulate re-dispatch to accommodate large renewable additions to meet a 33-percent RPS in California.

For *in-state* generation it would be valuable to have the same aggregated and disaggregated generator information summarized above for out-of-state generation, *separately* for each of each of five California areas identified in WECC power flow cases: PG&E, Southern California, SDG&E, Imperial ID, and LADWP. Additionally, distinguishing dispatchable and non-dispatchable fossil would contribute to understanding and discussing redispatch issues.

**CTPG Study Team Response:**

The WECC-wide loads, generator-specific output, line losses, and generator-specific Pmax and Pmin are available in CTPG's Phase 1 power flow cases which will be made available to interested stakeholders executing and/or holding the appropriate non-disclosure agreements. The Pmax (installed capacity) and Pgen (amount of output during the hour studied by the power flow cases) for the added out-of-state renewables to meet California's 33-percent RPS

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<sup>1</sup> It would be even more informative, especially for understanding redispatch assumptions and implications, to break out "Northwest" and "Arizona" generation, but this is not being requested.



under different cases are available, by technology and by state, in the Excel spreadsheet sent to the CPUC staff on January 21, 2010.

In connection with its Phase 2 studies, CTPG will be publishing the assumed levels of out of state wind capacity that will be added over and above the amounts of out-of-state wind capacity included in the WECC 2019 HS1A case.

The CTPG Study Team has not yet determined whether it will be practical to provide the aggregated and disaggregated generator information summarized at the levels requested by the CPUC staff.

7. To robustly assess the impact of re-dispatch assumptions, especially in the absence of explicit treatment such as via production simulation, it is necessary to consider a credibly wide range of re-dispatch alternatives. Two issues in particular may lead to a wider range of re-dispatch scenarios, and should be considered for inclusion in the CTPG studies.

First, it is clear that renewable generation additions outside of California load centers will compete with energy imports for use of some transmission paths into these load centers. Heavier reliance on *out-of-state* re-dispatch, including re-dispatch of coal units, which may be consistent with energy policies by 2020, could reduce competition for certain transmission paths, and thus the amount of transmission needed to accommodate new renewable generation. Such a “congestion management” re-dispatch might go further in reducing congestion than CO<sub>2</sub> (and other) emission-reducing dispatch alone, as is planned for CTPG’s Phase 2 studies. Some re-dispatch of storage hydro (shifting to other hours, not dumping energy) might be part of a “congestion management” re-dispatch. We recognize that at some point, redispatch issues would need to be examined via production simulation or other operationally dynamic studies.

Second, decrementing in-state fossil generation to accommodate renewables could cause the amounts of on-line generation and/or on-line *flexible* generation (e.g., to provide regulation and load following) to approach or fall below prudent levels in some areas, such as coastal Southern California. If and how assumed re-dispatch brings us close to this point should be clarified.<sup>2</sup> If it does bring us close, then a “reliability” redispatch should be considered that is aimed at preserving greater local on-line capacity and/or on-line flexible capacity. Such a redispatch scenario may or may not look a lot like a “congestion management” re-dispatch

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<sup>2</sup> Documentation addressing WECC power flow cases (*WECC Data Preparation Manual for Power Flow Base Cases...*, August 2009) defines a “reserve factor” for each area (such as LADWP or SDG&E) as  

$$100 * [ (P_{max} - P_{max}(BL)) - (P_{gen} - P_{gen}(BL)) ] / [loads + losses].$$

This effectively represents aggregate unused upward generation range (between P<sub>gen</sub> and P<sub>max</sub>) for all generators in an area, if excluding those generators identified as BL (base-loaded, and unable to provide mechanical response to low frequency) and apparently also excluding those generators whose P<sub>gen</sub> is 0 (i.e., those that are off line, and in some cases not even operable). It appears likely that a somewhat different measure of operating reserves may be more appropriate for indicating the implications of redispatch for the system’s flexible response capability.



scenario described above, and in any event would provide increased study robustness, in terms of identifying needed transmission additions.

The above “congestion management” and “reliability” redispatches may or may not significantly alter estimated conceptual transmission needs for integrating large amounts of renewable generation. This remains to be demonstrated, either in this planning venue or elsewhere. The same may also be said for the potential of storage and demandside measures to help address local capacity, flexibility and/or transmission needs.

**CTPG Study Team Response:**

CTPG agrees that to the extent additional in-state renewable generation is balanced with out-of-state decrements of fossil-fired generation, power flows on the interties into the state of California will tend to be reduced. Where additional in-state renewable generation is located along these interties, constraints that would otherwise be present may be mitigated.

CTPG’s Phase 2 study includes a “Fuel Type & Technology” scenario where coal generation is the first tranche of fossil-fired generation that will be decremented. CTPG believes that among the cases studied in Phase 1 and 2, the “Fuel Type & Technology” scenario with coal decrements will represent the highest amount of CO<sub>2</sub> reduction.

Whether storage hydro could be used to mitigate constraints that would otherwise be present depends on where the constraints are relative to the location of the storage hydro facilities and the time of year that such constraints are likely to exist. For example, the Big Creek hydroelectric system is upstream from the Tehachapi CREZ and, if storage were available, could be effective in mitigating constraints that would otherwise arise with high levels of wind generation. However, if high wind output occurred during the spring runoff season, there might be little storage available to mitigate downstream congestion. As the CPUC staff notes, production cost simulations would be necessary to make a determination of whether the use of storage hydro to mitigate constraints would be more economical than other mitigation measures such as adding new transmission infrastructure or implementing operating measures such as cross-tripping generation for certain contingencies.

CTPG agrees with the CPUC Staff that it will be necessary to have enough dispatchable generation available to reliably integrate a large amount of new renewable generation, much of which will be intermittent. The California ISO is currently conducting a renewable integration study focused on California’s 33-percent renewable target. The results of this study should provide some indication of whether existing dispatchable resources (including continued operation or repowering of those fossil-fired generators identified to be retired as a result of the initiative to retire coastal units using once-through-cooling, storage hydroelectric facilities, and pumped storage hydroelectric facilities) will be adequate to meet California’s 33% renewable resource goals. CTPG believes the most sensible course of action at this point is to wait until the CAISO’s 33-percent renewable integration report is released to determine whether, and if so, how much, new dispatchable generation is likely to be added.

All of California’s balancing authorities have an interest in predicting the amount of dispatchable generation that will be required over time. These predictions should provide



useful information that will guide commercial decisions as to, (a) which existing dispatchable generators should be repowered or retired, and (b) what new dispatchable generation might be profitable to add.

**Comment Received:**

CPUC Energy Division Staff requests that CTPG provide some high-level assessment of the routing implications of the CTPG transmission plan. CPUC Staff recognizes the desire to maintain a clean divide between electrical planning and routing, but this divide is somewhat artificial. Early drafts of RETI's conceptual plan benefited greatly from informal review by environmental groups, resulting in material changes to the plan's electrical configuration. CPUC Energy Division Staff recommends that in Phase 2, CTPG consult with the RETI Environmental Working Group, which has already assessed each of the transmission line segments included in the RETI Phase 2A Conceptual Plan. Where CTPG's Phase 2 studies identify substantial transmission segments not yet identified and assessed by RETI, Staff believes that the CTPG will find the Environmental Working Group ready and willing to provide feedback, if not "official" RETI scores, for those segments. Staff also believes that such early feedback from knowledgeable stakeholders – even if very informal – is critical to the development of transmission projects that can be planned, permitted and built in a timely manner.

**CTPG Study Team Response:**

CTPG is considering the CPUC staff's suggestion to include some form of high-level routing information in its conceptual transmission plan and to consult with the RETI Environmental Working Group regarding this information.