

**California Transmission Planning Group (CTPG)
Technical Study Team's Response to October 5, 2010 Comments of the
California Energy Commission (CEC) Staff on
CTPG's draft 2010 Phase 4 Study Plan**

CEC Staff Comment:

- 1. Development of a scenario for the retirements of the State's Once-Through Cooling (OTC) units and its impact on the transmission system and the type of generation development that should be constructed.**

The CTPG Phase 2 Study indicated that OTC needs were independent of RPS. The CEC staff submitted comments on the Draft Phase 3 Study Plan on April 28, 2010, disagreeing with CTPG's perspective since transmission and generation upgrades in support of OTC replacement strategies will likely result in fewer incremental transmission modifications needed to meet the 33 percent renewable goals. Evaluating OTC policy for old steam boiler power plants both increases aggregate generation development and could reshape what kind of generation development minimizes the aggregate capacity that needs to be constructed.

The joint CEC-CPUC-CAISO proposal to the State Water Resources Control Board (SWRCB) was included in the OTC policy that was adopted on May 4, 2010, which calls for the use of transmission originally needed for renewable resources to replace some OTC capacity. Studying OTC outside of this context does not provide information relevant to energy policy makers.

The CEC staff recommends the CTPG develop, at a minimum, an OTC retirement sensitivity case for the Southern California Alternative Analysis, since most of the retirements will be in Southern California. This case would provide input as to the impact the State's OTC policy could have on generation development and the transmission system."

CTPG Technical Study Team Response:

The CTPG Technical Study Team agrees that the extent to which specific coastal generating units using OTC technology are retired or refurbished can have an impact on the location and severity of reliability criteria violations that may arise with different renewable portfolios given certain underlying system conditions (e.g., system load levels).

Given the current schedule for completing the CTPG's Phase 4 work, it does not appear possible to develop an "OTC retirement sensitivity case," and conduct the necessary study work, in Phase 4. The CTPG will, however, consider performing the OTC retirement case suggested by the CEC staff as part of the CTPG's 2011 work.

CEC Staff Comment:

- 2. Evaluation of the impact of renewable development on the SCIT Nomogram.**

CEC staff recommends the CTPG evaluate how renewable development will impact satisfaction of the SCIT Nomogram and whether it is necessary to evaluate the transmission system upgrades that enable a greater proportion of expected renewables development to count toward satisfying the SCIT Nomogram. CEC staff is unaware of active studies to devise a planning version of the methods used to develop the seasonal SCIT Nomogram now used to schedule resources, although discussion of this topic may surface efforts that have not heretofore been public. CEC staff believes greater transparency about the implications of the SCIT Nomogram as a constraint on generation development is necessary to guide decisions for both transmission and generation development.

The following four steps constitute a proposed method for tackling this topic:

- Step 1: Determine what power plant development resides within the SCIT cutplane and contributes inertia toward system stability and what does not. This knowledge is critical to evaluation of the impacts of renewable development in satisfying overall system requirements.
- Step 2: Devise an approximation to the current methods that develop the seasonal SCIT Nomogram that are useful in the planning time horizon. Such methods would be used in conjunction with renewable development scenarios to assess whether sufficient system inertia exists in a hypothetical future to satisfy reliability criteria.
- Step 3: Apply this new method to assess each scenario to determine if the planning version of SCIT was satisfied. Failure to satisfy the criteria would impose complementary fossil development within the SCIT cutplane up to a level at which the planning version of SCIT was satisfied. This is similar to evaluating proposed generation/transmission additions, observing thermal violations on transmission elements, and identifying remedial measures to eliminate the violation.
- Step 4: Assess an alternative method for mitigating SCIT violations observed in Step 3. Rather than investigating how much additional generation needed to be added within the SCIT cutplane, this step would identify whether upgrades to the transmission system would allow greater proportions of renewable development to be considered within the SCIT cutplane.

The CTPG and other renewable assessment efforts are determining limited facets of the implications of large scale renewable development. An initial effort to evaluate the component of system stability that the SCIT Nomogram represents is another facet that is needed.

CTPG Technical Study Team Response:

The CTPG's studies to date have not examined whether the various renewable resource portfolios evaluated in Phases 1, 2 and 3 would—for the specific system conditions studied—give rise to levels of southern California inertia, *i.e.*, power flows into southern California (as defined by the current SCIT cutplane) and power flows on the East-of-River (EOR) system that would exceed the boundaries of the existing EOR - Southern California Import Transmission (SCIT) nomogram.

The CTPG Technical Study Team agrees with the CEC staff that the implications of developing renewable generating sources outside of the southern California area, with concomitant reductions in fossil-fired generation within the southern California area (which reduces the amount of inertia used in determining safe operating ranges within the EOR – SCIT nomogram), need to be evaluated with regards to maintaining reliable system performance.

There are several complexities that would need to be addressed before meaningful conclusions could be drawn from any analysis that included the EOR-SCIT nomogram. First, the transmission lines that comprise the EOR path in the CTPG's studies are different than those used in developing the existing EOR-SCIT nomogram (e.g., the CTPG's studies include Arizona Public Service's planned 500-kV Hassayampa-North Gila line). Second, depending on the scenario that is studied and the transmission infrastructure additions that may be identified as an outcome of those studies, the transmission lines that comprise the SCIT cut-plane in CTPG's studies may be different than those used in developing the existing EOR-SCIT nomogram (e.g., some CTPG studies identify upgrades between Kramer and Lugo, between the southern Nevada and Victorville/Lugo area, and between the Imperial Irrigation District system and the California ISO system). Third, the existing EOR-SCIT nomogram has not been studied below 40,000 megawatt-seconds of inertia so it is unknown whether system performance below 40,000 megawatt-seconds would be reliable and what the maximum allowable simultaneous EOR and SCIT flows would be at these lower levels of inertia.

The disposition of the coastal units using OTC technology may have a significant effect on the amount of inertia in southern California. This could be an important factor in establishing whether a given renewable resource portfolio could result in inertia and power flows that are outside of whatever EOR-SCIT nomogram emerges after consideration of the above complexities.

Finally, as the CEC Staff's suggested stepped-approach appears to recognize, there are economic tradeoffs between incurring the costs to (a) add new sources of inertia within southern California (which would allow higher levels of simultaneous EOR and SCIT power flows), (b) add new transmission that would increase the amount of simultaneous EOR and SCIT power flows permitted for a given level of southern California inertia, and (c) re-dispatch fossil-fired generation so as to increase the amount of inertia within southern California for a given renewable resource portfolio (which would allow higher levels of simultaneous EOR and SCIT power flows)¹.

In sum, given the schedule for completing the CTPG's Phase 4 work, the CTPG Technical Study Team does not believe it is feasible to undertake a meaningful assessment of EOR-SCIT nomogram impacts in Phase 4. However, the CTPG Technical Study Team believes that this assessment should be a high priority item for consideration in developing the CTPG's work plan for year 2011.

CEC Staff Comment:

3. Consideration of other state energy goals: (a) incremental energy efficiency impacts on load; and (b) incremental distributed generation and combined heat and power (CHP) impacts on load.

CEC staff commends the CTPG for assessing transmission needs to meet the state's renewable goals. To better understand California's transmission needs, the CTPG should include other state energy goals in its assessment. The CEC staff recommends that the CTPG include in its assessment incremental energy efficiency impacts on load and incremental distributed generation and CHP impacts on load.

¹For example, decreasing fossil-fired generation north of the Lugo/Victorville area and increasing fossil-fired generation in southern California. To the extent this re-dispatch would require relatively efficient fossil-fired generation to be backed-down, and less efficient fossil-fired generation to ramp-up, a cost would be incurred.

On September 21, 2010, the California Air Resources Board, California Energy Commission, California Public Utilities Commission, and California ISO jointly released a series of documents supporting a policy view of the future called California Clean Energy Future (CCEF). Not only do these jointly issued documents identify a vision for the future electricity system, they identify concrete steps in which existing electricity planning systems should be modified to address this vision. In addition to the high renewable future that the CTPG has been investigating, CCEF recognizes high levels of energy efficiency savings and other programmatic load modifiers. The CTPG should be assessing renewable development, and corresponding transmission needs, in light of incremental energy efficiency and other load modifiers.

WECC's Transmission Expansion Planning Policy Committee (TEPPC) and FERC's efforts to reshape transmission planning also recognize that transmission planning efforts ought to address state policy goals. The current round of transmission planning undertaken by TEPPC is adjusting the base case load forecasts that balancing authorities submitted to WECC before transmission assessments are undertaken. They are also developing and will assess a high DSM scenario. The FERC transmission NOPR could explicitly impose a requirement that transmission planning be conducted in a manner that addresses state energy policy.

Although it may be too late to make a substantive change to baseline loads in developing power flow base cases for the proposed Phase 4 effort, the CTPG needs to adjust its processes for 2011 and beyond to conform with the emerging standards that the CCEF effort, WECC and FERC are now formulating. CEC staff can provide the detailed data necessary for modeling these important state energy goals."

CTPG Technical Study Team Response:

The CTPG Technical Study Team recognizes that the current renewable "net short" estimate is becoming increasingly stale and needs to be updated for purposes of the CTPG's activities beyond Phase 4. Presumably this update will consider the likely impacts of (i) incremental energy efficiency, (ii) incremental distributed generation including additional amounts of combined heat power, and (iii) other applicable state energy goals. The CTPG Technical Study Team expects that the Renewable Energy Transmission Initiative (RETI), working in conjunction with the California Energy Commission, will have a central role in updating the renewable "net short" estimate and encourages the CEC staff to work closely with RETI in the update process.

CEC Staff Comment:

4. Identification of the basis for satisfying planning reserve margins in California in the proposed Phase 4 Southwest Scenario.

The proposed Phase 4 Southwest Scenario proposes removing forty percent (40%) of new renewable generation located inside California and adding an equivalent amount of renewable generation in the southwest (including Wyoming and New Mexico resources). If this amount of generation is located outside California, does the CTPG plan to add generation in California to satisfy planning reserve margins in California?

From a planning reserve margin and also a redispatch perspective, can the CTPG define how this amount of renewable generation, removed from California, will be accounted for in the planning reserve margin

calculation and redispatch? It appears that a dispatch model must be run in order to determine what would be operating in California from a reliability perspective if forty percent (40%) of the renewable net short is relocated outside California. Simply assuming that removing an amount of renewable generation within California and locating this generation outside California would not affect dispatch and reliability in California seems highly unlikely.

CTPG Technical Study Team Response:

The reliance placed upon renewable resources located outside the state of California by California ISO load-serving entities does not preclude the Qualifying Capacity (QC) from those resources being counted towards California ISO Resource Adequacy (RA) requirements.² Similarly, the fact that non-ISO load serving entities may be relying on renewable resources located outside the state of California does not preclude those renewable resources from being counted towards whatever minimum installed generation requirements may apply to those non-ISO load serving entities.

Simply “removing” new renewable generation located inside California in some CTPG scenarios to locations outside California in other CTPG scenarios, does not change the amount of installed capacity that is available to serve load. Different locations of renewable resources do of course have different impacts on the transmission grid, and that is precisely what the CTPG’s technical studies are designed to evaluate. The CTPG’s technical studies identify reliability criteria violations and transmission infrastructure additions that mitigate those violations, *i.e.*, the CTPG addresses any issues it finds with respect to “reliability in California,” whether or not the assumed renewable resource portfolio includes significant amounts of renewable generation outside the state of California.

The CEC staff asks specifically how out-of-state renewable generation will be “accounted for in the planning reserve margin calculation.” To date, the CTPG has not attempted to determine how minimum installed generation requirements applicable to the different load serving entities within California would be satisfied given the various renewable resource development portfolios used by the CTPG in its studies. This type of determination would require assumptions about each load serving entity’s resource plans for year 2020. In addition, based on early indications from the renewable integration studies now underway in California, the current planning reserve margin concept may no longer be a suitable mechanism for securing the resources necessary to ensure the continued reliable operation of the grid. An approach that identifies the minimum amount of resources with the appropriate operating flexibility may actually become a driving force for resource planning.

In any event, with respect to planning reserve margins, the CTPG Technical Study Team believes the CEC staff is asking for an assessment that is well outside the current scope of the CTPG’s work. That said, the CTPG Technical Study Team welcomes the CEC staff’s suggestions as to (i) the amounts, locations, and types of new renewable and fossil-fired generation that are likely to be added to the system by year 2020, and (ii) the identity of existing generators that are likely to be retired by year 2020. This information would be useful as the CTPG develops its work plans for year 2011 and starts the process of developing its base case power flow models.

² The California ISO’s Resource Adequacy requirements are based on projections of each California ISO load serving entity’s loads plus a minimum planning reserve margin.