

**California Transmission Planning Group (CTPG)
Technical Study Team Responses to
October 7, 2010 Comments by Terra-Gen Power (TGP) on
CTPG's Draft Phase 4 Study Plan**

TGP Comment:

There is likely a larger amount of generation under development for delivery to California than will actually be developed; and this may present a problem with using queue data for the Phase 4 analyses. We understand the CTPG's reluctance to get involved with assessments of generation project viability; however, it would help the credibility and usefulness of the analysis if the CTPG could work with surrounding out-of-state Balancing Authorities to use public and readily available "commercial interest" indicators to do at least some screening, e.g., identifying projects with pending Transmission Service Requests with identified export points into California, or those that have progressed to advanced interconnection-study stages or provided financial security or deposits. This would help avoid the need for rougher assumptions, like equal-percentage capacity reductions.

CTPG Technical Study Team Response:

The CTPG Technical Study Team appreciates TGP's suggestion and has contacted a number of Balancing Authorities throughout the WECC region to determine what information is available that would allow the CTPG to gauge "commercial interest" in different renewable resource development areas across the WECC. The draft Phase 4 Study Report will summarize what CTPG has learned from its contacts with these Balancing Authorities.

TGP Comment:

Potential synergies between out-of-state and in-state development: Rather than look at the various out-of-state high-potential CREZs in isolation, the Phase 4 Study Plan should consider the possible joint economies of developing electrically related out-of-state and California CREZs.

One example is the relationship between the considerable solar and wind resources identified in the Owens Valley CREZ and the geothermal generation under development in northern Nevada. If transmission development for both areas is considered together, the incremental cost for transmission to accommodate Nevada geothermal generation would be likely be considerably reduced by significant Owens Valley development, and vice versa.

There are likely other instances of these synergies between different high-potential renewable resource areas. Giving higher priority to transmission upgrades that could serve generation in multiple CREZs would also lower the risk that any such upgrades would be "stranded" and/or underutilized.

CTPG Technical Study Team Response:

The CTPG Technical Study Team believes its analysis captures potential synergies between different CREZs and renewable resource development areas. This is accomplished in the power-flow cases by modeling the expected simultaneous output for all renewable technologies in the CREZs/renewable resource development areas evaluated in a given study scenario. Using this approach, the CTPG is able to account for the fact that, for example, wind generation may be relatively low during summer peak hours while solar generation may be relatively high during those same hours.

TGP Comment:

Transmission economics: Renewable-energy technologies with high load factors will more fully utilize transmission than those with lower load factors – *i.e.*, the former will provide RPS benefits at a lower per-megawatt-hour transmission cost than the latter, and access more renewable energy per megawatt of added transmission capability. Any statewide transmission plan should consider this important element in order to give the state the ability to meet a thirty-three percent (33%) RPS at the lowest possible cost. It also assures that peak demands are being met and managed appropriately.

CTPG Technical Study Team Response:

The CTPG Technical Study Team agrees that higher utilization of planned transmission facilities will usually improve the cost-effectiveness of proposed transmission additions relative to other alternatives. The determination of whether the transmission infrastructure additions identified in the CTPG's study work are more economical than other wires- and non-wires alternatives is not, however, currently within the scope of the CTPG's work. This type of analysis will be conducted by the project sponsors for proposed transmission projects and should be reviewed by the applicable transmission permitting authorities.

TGP Comment:

Integration requirements: All other things being equal, renewable-energy technologies with steady, "baseload" operations (*e.g.*, geothermal or biomass) will require fewer other resources and/or active grid management to balance variability and maintain reliable grid operations, and will thus not require costs to be incurred for such resources and operations. Such baseload technologies may also readily be adjusted downward to address potential over-generation conditions and offer additional benefits that can help the Grid Operators (*e.g.*, California ISO, Los Angeles Department of Water and Power, Sacramento Municipal Utility District, *etc.*) manage other intermittent renewable resources; they are natural replacements, and true hedges, for coal and natural gas, without the price risks inherent in those technologies.

CTPG Technical Study Team Response:

The CTPG Technical Study Team agrees that "baseload" renewable resources such as geothermal will place less of an integration burden on Balancing Authority operators than intermittent renewable resources. The evaluation of integration requirements associated with renewable resources is, however, outside the scope of the CTPG's Phase 4 work.

TGP Comment:

Scheduling issues: The California ISO has commenced an initiative to consider a “Dynamic Transfer” framework to accommodate imports between balancing authority areas; the complexities of such a framework has forced the California ISO to postpone that effort into next year while it first conducts operational studies to determine any operational limitations on such arrangements. Geothermal and other flexible baseload technologies:

- Do not require such complex Dynamic Transfer arrangements between balancing authority areas, and can readily be scheduled using today’s hourly, “static” scheduling practices; and,
- Can help accommodate future Dynamic Transfer arrangements for intermittent resources, by providing flexibility that the California ISO can use to manage variability of those resources while ensuring that scarce import transmission resources are fully utilized.

CTPG Technical Study Team Response:

The CTPG Technical Study Team agrees that “baseload” renewable resources such as geothermal will place less of an integration burden on Balancing Authority operators and facilitate deliveries across control area boundaries. To the extent such baseload renewable resources can be dispatched up and down in response to system operational needs, the CTPG Technical Study Team agrees that such resources will support the expansion of dynamically-scheduling between balancing authority areas. As noted above, renewable integration issues are, however, outside the scope of the CTPG’s Phase 4 work.

TGP Comment:

Given the large amount of transmission that will be needed to accommodate a thirty-three percent (33%) RPS by 2020, any usable transmission plan must include consideration of the timing for development of different new-generation areas. Transmission owners cannot build all the needed new facilities simultaneously, and hard choices will have to be made about where to start implementing any transmission plan.

Transmission-project timing is particularly important for the projects vying for federal stimulus incentives (so-called “ARRA Projects”), several of which are in the Bureau of Land Management Fast Track process and could enter the market quickly. These projects, and others in advanced development, have a near term need for certainty, and for actual transmission sooner rather than later, to remain viable and meet their development milestones.

Thus, in addition to incorporating information about out-of-state interconnection queues and project readiness, as discussed elsewhere in these comments, the Phase 4 analyses should use the associated Commercial Operating Dates of the interconnection requests to help prioritize and sequence its transmission recommendations. This would greatly improve the relevance and usefulness of the ultimate CTPG statewide transmission plan to both transmission and generation developers.

CTPG Technical Team Response:

The CTPG Technical Study Team appreciates the perspective of TGP on the timing of transmission infrastructure additions and agrees that new transmission will be constructed and placed in-service at different points in time over the next ten years. The CTPG will consider TGP's suggestion to use the estimated Commercial Operation Dates of prospective generators to develop a suggested sequencing of transmission infrastructure additions included in the CTPG's statewide transmission plan.

TGP Comment:

TGP suggests that the California ISO consider:

- Upgrading the Control-to-Kramer corridor to 500 kV;
- Creating a 500-kV connection from the upgraded Control Substation to the Fresno area (e.g., Helms) that would tie into Pacific Gas & Electric's proposed Central California Clean Energy Transmission Project (C3ETP), perhaps also looping in Southern California Edison's Big Creek generation (to address oscillation and other operational issues), as specified in several C3ETP analysis scenarios; and,
- Upgrading Path 52 to handle higher transfer capability to access renewable resources located in Nevada.

This configuration would have several significant operational benefits, for example, it would:

- Create a robust northern California transmission loop, that augments transfer capabilities across Path 26;
- Increase system reliability and operational flexibility, which could potentially be improved by use of DC transmission system (line or cable) in the Control-to-Fresno corridor;
- Provide Pacific Gas & Electric and northern California municipal utilities additional access to renewable Resource Adequacy (RA) resources, without the constraints imposed by the California Public Utilities Commission NP26/SP26 locational limitations; and,
- Provide an alternative and effective path for Owens Valley and Nevada generation to enter the California ISO grid without traveling through the already-limited Los Angeles Basin and related areas and corridors.

CTPG Technical Study Team Response:

The CTPG Technical Study Team appreciates the suggestions made by TGP to strengthen the California electric grid. The CTPG has already considered some of these suggestions. For example:

- The CTPG's Phase 1, Phase 2 and Phase 3 studies considered the transmission infrastructure additions in the central Nevada to Kramer area that would mitigate identified reliability criteria violations and determined that 230-kV upgrades would be sufficient given various renewable resource development portfolios; and,

- The CTPG has also considered the option of upgrading Path 52. A discussion of this option is provided in the “*California Transmission Planning Group Study Team’s Assessment of the ‘Transmission Needed’ for Path 52 Imports (As Suggested in Terra-Gen Power’s Comments on CTPG’s Phase 3 Study Plan)*.” This assessment is posted on the CTPG website.

While CTPG has not to date undertaken any economic assessments of how potential transmission infrastructure additions would compare to other wires- and non-wires alternatives, stakeholders should understand that there can be a variety of measures to address “oscillation and other operational issues,” “system reliability and operational flexibility,” “constraints imposed by the...NP26/SP26 locational limitations,” and “the already-limited Los Angeles Basin and related areas and corridor.” These measures can include new transmission lines (such as those identified in the CTPG’s Phase 1, 2 and 3 studies and those proposed by independent transmission developers), the addition of new reactive power sources (e.g., capacitors, Static VAR Compensators (SVCs)), pre-contingency redispatch of generation (i.e., congestion management), tripping generation for certain N-1 and N-2 contingencies, tripping load for N-2 contingencies, cross-tripping transmission facilities for certain contingencies, inserting or by-passing transmission devices in certain conditions (e.g., bypassing series capacitors), adding generation or load (for example, energy storage facilities) in strategic locations on the transmission network, increasing the penetration of distributed generation, and expanding energy efficiency and demand-side management programs.

Deciding which measures meet the needs of the grid and provide the best overall result for consumers will require economic evaluations which are currently beyond the scope of the CTPG’s Phase 4 work.