

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

**Terra-Gen Power Comments  
Re CTPG's draft Phase 2 Study Plan<sup>1</sup>**

**Comment Received:**

Terra-Gen recommends that the CTPG studies include the considerable geothermal resources – reliable, non-intermittent resources – that have the potential to be developed in Nevada in the base and sensitivity cases. Terra-Gen provides the following estimates of the potential geothermal resources in these areas:

- Northern Nevada geothermal imports Base cases: Minimum 200 megawatts of capacity
- Geographic import sensitivity case: Additional 200 megawatts
- Transmission path assumed:
  - Base cases Silver Peak south to Kramer
- Geographic import sensitivity cases:
  - Same as base cases – remove from Northwest Case in draft Plan, add to Southwest Case
- Transmission upgrades that should be considered, for both base cases and sensitivity cases:
  - Transmission into Nevada (collector system)
  - Path 52 enhancement
  - Transmission south, from Control to Kramer<sup>2</sup>

**CTPG Study Team Response:**

CTPG's Phase 1 studies modeled new renewable resources in the locations, quantities and technologies specified in the CTPG members' renewable procurement plans. These plans included 239 megawatts of geothermal capacity (1885.9 gigawatt-hours of annual energy production) located in central Nevada. Based on the renewable procurement plans, this generating capacity was connected to the 230-kV Dixie Valley bus ("Oxbow A") (69.2 MW),<sup>2</sup> the 230-kV Control bus (120 megawatts), and the 230-kV Oxbow B bus (50 megawatts). Given these connection points, the Phase 1 studies did not identify any issues with Path 52 (the 55-kV Control-Silver Peak line). These quantities fall between Terra-Gen's recommended "Base case" and "import sensitivity case."

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<sup>1</sup> Terra-Gen also provided comments to the draft Phase 1 Study Report, covering many of the same topics addressed in this Response. The CTPG Study Team believes these responses address the comments in Terra-Gen's Phase 1 comments and will not be providing a separate response.

<sup>2</sup> Note that the existing 230-kV Dixie Valley-Control #1 line has a rating of 434 MVA normal/449 MVA emergency. Pursuant to the CTPG's Guidance Document, CTPG's transmission planning work is conducted "without pre-established institutional requirements that any expansions or upgrades be operated or controlled by a specific balancing authority or under any specific contract or tariff arrangement." CTPG's assumption is that additional generating capacity could be accommodated by the existing 230-kV Dixie Valley-Control #1 line.

The final Phase 2 Study Plan includes a Northwest Scenario with 600 megawatts of wind and 400 megawatts of geothermal generating capacity in northern Nevada. This generation would be connected such that the power would flow onto the California-Oregon Intertie (COI) at Round Mountain substation and/or at Olinda substation. As currently structured, the Northwest Scenario would not require an upgrade of Path 52, an expanded Control substation, or an extension of the CAISO grid from Silver Peak substation into central Nevada.

As we understand Terra-Gen's comments, Terra-Gen is recommending that a "geographic import sensitivity case" be run, modeling the 400 megawatts of northern Nevada geothermal in the *Northwest* scenario as being delivered through the Control substation in the *Southwest* scenario. CTPG does not believe there will be enough time to conduct this sensitivity case during Phase 2 but will consider it for future phases of CTPG's work.

Finally, CTPG's Phase 1 studies assume the two existing lines in the Inyokern-Kramer corridor (one of which is currently operated at 115 kV, the other at 230 kV) are converted to 230 kV Inyokern-Kramer #1 and #2 lines by connecting the two existing lines to a new 230-kV bus at Inyokern substation. (See the draft Phase 1 Study Report, Tables 11 and 30 for the Inyokern CREZ.) Given the amount of new renewable generation specified in the CTPG members' renewable procurement plans (239 megawatts of geothermal in central Nevada and 242 megawatts of solar thermal in the Inyokern CREZ), double circuit 230-kV lines between Inyokern and Kramer substations should alleviate any "bottleneck at Inyokern" that would otherwise exist.

### **Comment Received:**

Terra-Gen recommends that the Phase 2 study include the following California ISO interconnection queue generation projects in CTPG Phase 2 renewable-portfolio scenarios:

- All Serial-Group projects and Transition Cluster projects; and,
- Any later-submitted projects that might have a significant impact, as sensitivity cases.

Projects with power purchase agreements not included in the above categories should also be included in the CTPG studies, but those included the above categories should be included even if they do not yet have power purchase agreements if they are active in the interconnection queue."

### **CTPG Study Team Response:**

CTPG appreciates Terra-Gen's suggestion. In response to this and other stakeholder input, the Phase 2 analyses will include a renewable resource portfolio based on the renewable generation interconnection queues of CTPG's members. As described in the final Phase 2 Study Plan, the criteria that will be used for the California ISO queue will be to include projects that are in the following stages in their interconnection process:

1. For serial interconnection studies (LGIP and SGIP), all renewable projects with all interconnection studies completed and that have either signed or are in process of signing their interconnection agreement; and,
2. All remaining renewable projects in the California ISO Transition Cluster (after posting of financial security).

These criteria were chosen both to limit the set of resources to a total amount of capacity needed to achieve the renewable portfolio standard (thirty-three percent of energy delivered to retail loads in 2020), and to focus on projects that are in the most advanced state of development or that have otherwise demonstrated the highest financial commitment. For the California ISO queue, approximately 15,000 megawatts of resources were selected based on the above criteria. The Phase 2 Study Plan also adds the proposed renewable generation projects and associated transmission for renewable energy projects from the other CTPG planning entities (IID, LADWP, SMUD, TANC, and TID) to make up the balance of the renewable energy necessary to meet the renewable portfolio standard. These projects consist of approximately 3000 megawatts of installed renewable capacity. These projects, shown in Table 4.3, are considered by the respective planning entities to be the most advanced in their respective approval processes.

The aggregate of the California ISO queue projects and the other state planning agency projects resulted in renewable energy deliveries amounting to thirty-five percent of total energy. Because this amount exceeds the renewable portfolio standard, CTPG scaled down all queue projects equally so that the energy delivered from the aggregate of all proposed projects equals thirty-three percent of retail loads. This scenario contains approximately eight percent of energy generated out-of-state, however, other scenarios planned for study in Phase 2 will consider larger import levels and associated impacts.

The CTPG Study Team will post a breakdown of these resources by technology and location shortly.

**Comment Received:**

In the base cases, Table 3 of the Plan (list of generation resources in the base case) shows that the amount of Nevada North CREZ generation to be included in the CTPG Phase 2 analysis has not yet been determined. No such generation was included in the CTPG Phase 1 analysis.

**CTPG Study Team Response:**

As noted earlier, the Phase 2 Study Plan includes a Northwest scenario assuming the addition of 600 megawatts of wind and 400 megawatts of geothermal generating capacity in northern Nevada. This generation would be connected such that the power would flow onto the California-Oregon Intertie (COI) at Round Mountain substation and/or at Olinda substation.

**Comment Received:**

In the geographic import-sensitivity case, the draft Phase 2 Study Plan includes a Northwest Case that assumes 1,000 megawatts from northern Nevada (600 megawatts of wind and 400 megawatts of geothermal). Terra-Gen recommends that the CTPG analysis reflect, consistent with the RETI Phase 2A Report, the significant northern Nevada geothermal potential as follows:

- In the base cases: At least 200 megawatts of installed geothermal generation capacity in the Nevada North CREZ, with about 1,600 gigawatt-hours of annual production. As noted in its prior comments, Terra-Gen believes that this is the minimum amount of generation that should reasonably be expected for this area.
- In the geographic-sensitivity cases: An additional 200 megawatts of northern Nevada geothermal capacity, based on the Nevada Energy interconnection queue.

**CTPG Study Team Response:**

Please see the response to the first comment discussed above.

**Comment Received:**

Regarding the Northern Nevada generation import path into California, both the RETI Phase 2A Report and the draft CTPG Phase 1 Report assumed that central Nevada generation would enter California through Path 52 (Silver Peak to Control Substation) and then proceed south to Inyokern and then Kramer. It is unclear from the draft Phase 2 Study Plan whether this assumption will be used for the CTPG Phase 2 analyses, and there is no information about the import path that would be assumed for any northern Nevada geothermal imports.

**CTPG Study Team Response:**

Please see the response to the first comment discussed above.

**Comment Received:**

Terra-Gen believes the most feasible path for northern Nevada geothermal generation to enter California is the same as assumed for central Nevada – through Path 52 and then south to Kramer Substation (via Control). The regional utilities in the northern Nevada area (e.g., Nevada Energy) have no concrete or approved transmission plans, or any commitments, to build transmission lines to COI, and such a transmission plan would be unlikely to win public support in Nevada due to the lengthy permitting process and long distances to interface with California-Oregon Intertie. Access to this generation over Path 52 would be a less-risky, more economical and environmental friendly assumption for the northern Nevada generation since transmission lines can be built along existing

corridors over much shorter distances, in both the base cases and the geographic import-sensitivity cases. Thus, for northern Nevada geothermal imports in the CTPG Phase 2 analysis, the CTPG should assume the same Silver Peak-to-Kramer path as for central Nevada imports. This assumption should be reflected for the 200 megawatts of recommended base-case generation, and the additional 200 megawatts of generation in the import-sensitivity cases should be subtracted from the Northwest Case and added to the Southwest Case.

The CTPG Phase 2 analysis should consider the upgrades listed below, to accommodate northern Nevada geothermal imports in the base and sensitivity cases:

- *Transmission in Nevada:* While the State of Nevada has recently completed a conceptual transmission plan, the export options considered in that report do not appear to include a terminus at Silver Peak, and it is not clear which export options will be pursued, or how or when those decisions will be made. Thus, the CTPG plan should include other options, e.g., selected extension of the CAISO transmission system from Silver Peak into Nevada. This is critical for the CTPG analyses, because no Nevada entities are CTPG members, and large-scale cooperation between California and Nevada planning entities is not contemplated until after the CTPG plan is done. Thus, the CTPG cannot assume that those entities will construct the transmission necessary to access Nevada geothermal resources. The recent SCE-proposed El Dorado-Ivanpah line is a sign that California transmission owners are beginning to recognize that they must consider extending their systems into Nevada to access renewable resources there;
- *Path 52 upgrades:* This double-circuit 55-kV line between Control and Silver Peak substations provides only severely limited transfer capability and cannot accommodate anything near probable geothermal imports into California from northern and central Nevada. Expansion of this path should be considered in the CTPG Phase 2 analyses;
- *Transmission south to Kramer:* Terra-Gen is concerned that the CTPG Phase 1 Report, which included a recommended new line from Control to Inyokern, did not provide enough takeaway capability from Inyokern to Kramer. This could create a bottleneck at Inyokern, as both the Nevada and Owens Valley/Inyokern generation must go through the Inyokern-Kramer line to access loads. The next two CTPG phases should ensure that transmission upgrades from Control Substation southward provide sufficient capacity all the way to Kramer for all assumed northern/central Nevada and Owens Valley/Inyokern generating capacity.

**CTPG Study Team Response:**

Please see the response to the first comment discussed above. CTPG appreciates Terra-Gen’s perspective on northern Nevada geothermal imports, namely that this generating capacity will enter California through Control substation. CTPG members believe, however, it is also feasible that this generating capacity will connect to the California grid at Round Mountain substation. Accordingly, CTPG’s Phase 2 studies will include a Northwest Scenario with this configuration.

**Comment Received:**

Terra-Gen believes the draft Phase 2 Study Plan is unclear with respect to the description of different renewables portfolios that will be considered in the CTPG Phase 2 analyses. However, it appears that the following California ISO generation will be included in at least some such scenarios:

- *Renewable SGIP projects;*
- *Renewable LGIP Serial Group projects in the queue ‘with all interconnection studies completed and that have either signed or are in process of signing their interconnection agreement.’* The CTPG clarified on the February 2nd conference call that Serial Group projects without completed interconnection studies would not be included; and,
- *Renewable Transition Cluster projects.*

In addition, the CPUC “Discounted Core” portfolio might further screen these projects for viability, based on approved or pending power purchase agreements and perhaps other criteria.

Terra-Gen has four concerns about project exclusions under these proposals:

- *Serial Group projects without completed studies:* It makes no sense to exclude these generation projects, because:
  - Lack of completed studies is not in any way a reflection of the viability of a project, as CalWEA pointed out on the conference call. The California ISO and Participating Transmission Owners are conducting these studies and Interconnection Customers have little or no influence on their speed; moreover, some of the study delays have been caused by drop-outs of higher-queued projects causing re-studies, which obviously are not the fault of remaining projects, and,
  - None of the Transition Cluster projects have completed all their interconnection studies, yet the Plan proposal would include them anyway. Especially these projects placed the Initial Financial Security (IFS) to enter Phase 2 studies.
- *Non-renewable projects in the queue:* Once transmission is constructed, it is available for use by any generation on the system under the California ISO open-access rules. Failure to plan for upgrades needed to accommodate non-renewable generation could result in increased congestion wherever non-renewable generation might compete for transmission capacity with renewable generation;
- *Significant lower-queued projects:* Terra-Gen supports this concept generally. However, in cases where those projects might cause significant congestion or operating issues, or provide operating benefits, the CTPG Phase 2 analysis should consider this later generation in sensitivity cases;

- *Projects without Power Purchase Agreements:* A proposed generation project might not yet have an executed power purchase agreement, in large part because of ongoing uncertainties about transmission construction. This is particularly true for generation projects proposed in more remote but high-potential renewables areas. Thus, generation projects that have not yet secured power purchase agreements should not be penalized by exclusion from the statewide transmission-planning effort at this early stage. However, Terra-Gen has no objection to adding generation projects not in the Serial Group or Transition Cluster that do already have such agreements.”

**CTPG Study Team Response:**

CTPG considered Terra-Gen’s comments and the similar comments from other stakeholders when deciding the composition of the queue-based portfolio. However, as indicated earlier, including all of the California ISO serial queue generation projects, California ISO transition cluster queue generation projects, and other generation projects with power purchase agreements would result in the delivery of far more renewable energy than is required to meet California’s 33-percent Renewable Portfolio Standard (RPS) goal. At this time, CTPG is not planning to conduct transmission studies designed to accommodate more renewable energy than is required by a 33-percent RPS goal. It is therefore necessary to define reasonable criteria for excluding some of the generation projects in the California ISO’s interconnection queue, reflecting sufficient renewable generation most likely to achieve, without exceeding, the 33-percent renewable energy goal.