

**COMMENTS OF LARGE-SCALE SOLAR ASSOCIATION AND
CALIFORNIA WIND ENERGY ASSOCIATION ON PROPOSED PTO PER-UNIT COSTS
March 15th, 2011**

The Large-scale Solar Association (LSA) and the California Wind Energy Association (CalWEA) appreciate the opportunity to comment on the draft 2011 Participating Transmission Owner (PTO) standard per-unit transmission construction costs (PTO Costs).

Accurate and public PTO Costs are critical to CalWEA and LSA members. Published PTO Costs allow Interconnection Customers (ICs) to:

- ***Roughly estimate interconnection costs before submitting Interconnection Requests*** (“IRs”) – an important function because of the stringent IR financial commitments required under the GIP;
- ***Validate Phase I Study cost estimates.*** PTO Costs are applied directly in the Phase I Studies that cap Interconnection Customer (IC) cost exposure for Network Upgrades (NUs); any differences between the study costs and the PTO Costs must be explained. The Phase I cost cap is intended to provide certainty to ICs and aid their project-related economic decisions and financing activities.

Overview of comments: In actual practice, the PTO Costs have not achieved the intended objectives, in large part due to lack of CAISO oversight – specifically, the CAISO has not provided:

- ***Requirements for PTO Cost standardization***, i.e., estimation methodology, content of the information provided, or formats for that information; or
- ***Validation of PTO Cost consistency or reasonableness***, e.g., comparisons of each PTO’s costs with each other, and/or between the PTO Costs and other publicly available cost information, for the same equipment and facilities.

Each of these issues is discussed in detail below.

As the independent system operator, the CAISO should take responsibility for ensuring that published PTO Costs are complete, consistent between PTOs, and reasonable overall. By abdicating its responsibilities in these areas, and leaving these important matters to the interpretation of individual PTOs, the CAISO has undermined the intent of publishing PTO Costs.

CAISO requirements

The CAISO has not provided the PTOs with any requirements or guidance about estimation methodology, content of the information provided, or standard formats for that information.

Estimation methodology

- ***Objectives of the cost estimation:*** The most fundamental problem with the cost estimates is the apparent inconsistency between the cost-estimation objectives stated in the CAISO Tariff and those advanced by certain PTOs.

Appendix Y, Section 6.6 of the tariff provides that PTO Costs will be based on “the anticipated cost of procuring and installing such facilities.” PG&E’s costs, which it called “+/-25%,” seem at least theoretically consistent with this concept.

However, SCE (and, to some extent, SDG&E), have characterized the PTO Costs as “not to exceed” figures. As noted below, these PTOs add large contingency and other amounts that increase their cost estimates beyond “anticipated costs” to a maximum feasible cost exposure.

The CAISO should ensure that the objective here is development of “anticipated” (realistic) cost values, consistent with its tariff, that reflect actual costs for installing this equipment in California. The tariff is clear that the intent of posted PTO Costs is not to develop the highest possible Network Upgrade cost figures that can conceivably be justified.

Clarification and enforcement by the CAISO of this objective is critical if these figures are to be relied on by Interconnection Customers (ICs) in their pre-IR development activities and to provide a meaningful cost cap in the Phase I Studies.

- **Cost-estimation methodology details**

- **Starting points for the cost estimates:** None of the PTOs have explained the bases for their 2011 cost estimates. For example, it is not clear whether those starting points are based on actual 2010 cost data, projected data, or other information, and/or whether average costs for each facility type are used. In any case, these starting points differ significantly between PTOs, without any apparent reason for the differences (see below).

Any inflation adjustments must be well-defined and justified. Short-term fuel and commodity prices changes should not significantly alter the per-unit costs. With an appropriate escalation based on historical averages, the values should also be consistent among the PTOs as these costs are not location-specific.

Although the PTOs stated otherwise on the conference call, the salvage value of the structures and the conductors, particularly steel and copper, can be significant. These should be estimated and offset against the cost of their removal, as is done as a standard practice in “added or Special Facilities” type contracts similar to LGIAs.

- **Adjustment factors for physical conditions:** Each PTO uses multipliers to adjust the starting costs for factors like terrain and population density. However, the factors used, and the multipliers applied, are inconsistent. Some PTOs have higher multipliers than others for the same factors, and some PTOs have higher costs for the same factors that produce lower costs for others (see below).
- **Adjustments for “contingencies:”** SCE and SDG&E add a 35% “contingency” to the above adjusted estimates, which PG&E does not. The fact that SCE might follow this practice when it applies to the CPUC for cost recovery of major projects (for which it did not cite any references) is not any reason to apply this kind of adjustment to what are supposed to be realistic, “anticipated” cost estimates.

In fact, many of the factors that might otherwise account for a “contingency” adjustment are likely already covered by the adjustment factors for physical conditions (or the licensing, permitting, right-of-way costs that are not included in any of the PTO estimates). This large adjustment raises serious double-counting issues that must be addressed by the CAISO.

- **Further adjustments:** SCE then adds another 10% for a “contractor’s agent” fee. SCE has not explained the need for this adder or provided any justification for it, other than a statement that it typically adds this amount for an entirely different application.

Content of the information provided: Each PTO should provide cost estimates for all transmission voltage levels (60 kV and higher) of facilities it is likely to build for interconnection-related transmission projects. Specifically, each PTO should provide cost estimates for the 60-70 kV, 110-138 kV, 220-230 kV, and 500 kV voltage levels. Otherwise, generators whose interconnection would require facilities where costs are not provided would have no information about those costs, contrary to CAISO Tariff requirements and FERC directives in this area.

In addition, each PTO should provide both lattice tower and steel pole costs for both the 110-138 kV and 220-230 kV voltage classes that are most commonly used for interconnections, especially given the potentially significant difference in costs. Cost estimates should be provided for both single- and double-circuit costs in all voltage classes, for the applicable types of structures.

PG&E’s lack of complete 500 kV figures is particularly problematic, because those facilities are so costly and can make up a major portion of an IC’s interconnection costs even if it is allocated only a small portion of the cost of even one such facility. If a PTO does not have sufficient data to provide complete information for key equipment or voltages, the CAISO should require the PTO to develop such information using publicly available national or other similar figures for that purpose.

Format of the information provided: The PTOs do not present the data in a consistent format that ICs can understand and compare to other information that they may have, in order to determine reasonableness. The CAISO should develop a consistent data template for all its PTOs and require that the PTOs use that format to present their data. We would be more than glad to work with the CAISO and PTOs to develop that standard format.

CAISO validation

The CAISO has not validated the the PTO costs, by comparing costs between the PTOs, or comparing the PTO Costs with other publicly available information, to ensure that the costs are just and reasonable.

Cost comparisons between PTOs: The costs of standard transmission equipment, like steel poles and transmission lines, should significantly differ between the PTOs, as they generally use many of the same vendors. LSA and CalWEA are not asking for vendor names or PTO contractual information; however, if one PTO’s costs are substantially higher than another’s, the CAISO should determine the reason, and whether the difference it justified. It is only logical that the three largest utilities in California would have similar procurement costs for this standard equipment.

As noted above, it is difficult to readily compare costs between PTOs, because the estimation methodology and presentation formats are so different. However, we have attempted to do this for some transmission costs below to illustrate the huge disparities between the PTO costs. (The “SCE adjusted” figures are the SCE posted costs, less 35% contingency and 10% “agency” fee adders, to illustrate the still-significant disparity between the PG&E and SCE “starting point” figures.)

PG&E and SCE per-mile 230 kV line costs, before application of physical-condition multipliers
(in \$millions, rounded to nearest \$100K)

TRANSMISSION LINE FEATURES	PG&E	SCE posted	SCE adjusted
Double circuit, strung on both sides, lattice tower	1.7	2.7	1.9
Double circuit, strung on one side, lattice tower	1.3	2.3	1.6
Double circuit, strung on both sides, tubular steel pole	1.9	5.6	3.9
Single circuit, tubular steel pole	1.2	3.2	2.2

Similarly, cost difference for terrain and location should not vary excessively between the PTOs. We have shown the multipliers for those factors together below to illustrate the large differences.

PTO physical-condition multipliers for terrain & population density

PTO	TERRAIN			DENSITY		
	Hilly	Mountainous	Forested	Suburban	Urban	Rural
PG&E	1.2	1.3	1.5	1.2	1.5	1.0
SCE	1.5	2.0	3.0	2.0	3.0	1.0
SDG&E	1.2	1.3	N/A	1.1	1.0	1.3

We understand that the terrain varies to some extent, but equipment and construction in hilly or desert areas shouldn't differ much between northern and southern California. The approaches taken in the draft PTO Costs seem inconsistent – for example, it is not clear how rural costs could be both higher and lower than urban costs. These disparities should either be explained or removed.

To illustrate the huge disparities between the draft PTO Costs, consider a Phase I Study cost estimate for a 50-mile 230 kV double-circuit line on tubular steel poles, through an urban area, based on the posted costs and physical-condition multipliers shown above. The cost (not counting all the adders like permitting and right-of-way acquisition) would total \$142 million for PG&E but \$840 million for SCE. Even before the 45% inflation of SCE costs due to contingency and “agent” adders (see above), which would put SCE costs at \$585 million, the difference is tremendous.

We simply do not see how these or other large cost differences for the same facilities installed under the same conditions in the same state can be justified. There are other significant methodological differences as well – for example:

- **PG&E uses multipliers of up to 2.0 for lines less than 20 miles long**, while the others do not.
- **PG&E uses the same costs for 60/70 kV lines and 115 kV lines**, because it apparently uses 115 kV standards for new 60/70 kV construction; SCE and SDG&E have no such rules.
- **SDG&E uses multipliers of up to 1.3 for “environmental mitigation” factors**, while the others do not.
- **SCE uses multipliers of up to 1.6 for “weather study” factors**, while the others do not.

As noted above, this is not just an academic exercise – there are real consequences to ICs of these disparities. The CAISO should ensure that they are either removed or justified.

Cost comparisons with other publicly-available data: The draft PTO Costs appear to far exceed costs in other jurisdictions, many of which face more-severe weather conditions that would likely drive costs higher than in most areas in California. For example:

- The Midwest Independent System Operator (MISO) has estimated single-circuit 500 kV line costs at \$1.4 million/mile¹, compared to SCE’s estimate of \$4.3 million and SDG&E’s estimate of \$5.2 million, before multiplier adjustments (\$2.9 million and \$3.8 million, respectively, without contingencies and agency fees – PG&E did not even provide 500 kV figures); and

¹ See p.108 of MISO’s 2008 transmission expansion plan report, dated December 4, 2008 http://www.midwestiso.org/publish/Document/279a04_11db4d152b9_-7d8d0a48324a/2008-11_MTEP08_Report.pdf?action=download&_property=Attachment

- The Southwest Power Pool has estimated the cost of double-circuit 345 kV lines at approximately \$2.6 million/mile², compared to \$2.7-5.6 million (double-circuit) for SCE and \$5.2 million (single circuit) for SDG&E for 230 kV lines, which should cost considerably less than 345 kV lines.

There may be legitimate reasons why PTO Costs would be so much higher than those elsewhere. However, these comparisons serve to illustrate the reasons why the CAISO should validate the reasonableness of submitted PTO Costs by benchmarking them against public information on the cost of similar facilities of other Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs), and those of Publicly-Owned Utilities (POUs); significant differences between those costs and the PTO costs should be explained before the latter are finalized.

² See p.81 of the SPP 2008 transmission expansion plan report, dated February 23, 2009; \$4.5 billion / 1,700 miles = \$2.6 million/mile. http://www.spp.org/publications/2008_Approved_STEP_Report_Redacted.pdf